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# EDHEAD

## So long, and thanks for all the clocks

This is it.

From January next year, Atomic is going to merge with PC & Tech Authority, meaning that this magazine is the last standalone issue. Pretty heavy, huh?

It is, and I won't deny I'm sad, but on the flipside, we have some huge plans for PC & Tech Authority. John Gillooly's stepping up as Editor of that great mag, and we'll be adding a whole sixteen pages to the

page-count – and that will be dedicated to classically Atomic content, from games reviews and previews, the latest high-end PC components, and some of the best writers Atomic has ever produced, like Ashton Mills and Dan Rutter.

It's actually a pretty exciting chance to turn an already great magazine into an even better one, and I'm hoping you'll join us on the journey.

Actually, there's a sneaky trick I recommend. We'll be switching subscribers over, and they get a pretty good deal, as PC & TA is a bigger mag, with a DVD. So if you want to get in on the ground floor, why not sub right now, at Atomic rates. Go here [www.atomicmpc.com.au/Magazine/Subscribe.aspx](http://www.atomicmpc.com.au/Magazine/Subscribe.aspx) while you can, and get a fiendishly good deal while it lasts.

Consider it the last, cheeky little gift from Atomic.

And, to all of our readers, to everyone who I've worked with on the last crazy fifteen years...

Thank you, very much, for this fantastic opportunity. You're all of you the best people in the world.

Yes, even you.

David Hollingworth

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**Editorial and product submissions:** Atomic welcomes all information on new and upgraded products and services for possible editorial coverage. However, we respectfully point out that the magazine is not obliged to either review or return unsolicited products. Products not picked up within six months of submission will be used or donated to charity. The Editor welcomes ideas for articles, preferably sent in outline form, with details of the author's background and a few samples of previously published work. We cannot accept responsibility for unsolicited copy and stress that it may take some time for a reply relating to these submissions to be sent out.



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# 143

ISSUE



# 46



# ISSUE 143

24

## LOGIN

7

### Mod News

12

Mod madness with Ashton Mills.

### Gearbox

14

The newest, sexiest gadgets.

### X-Ray

16

Jake Carroll looks at how computing benefits stock trading.

### I/O

22

Our monthly helpdesk.

### Chris Avellone

26

Kickstarter, Project Eternity, what makes a game, and much more.

A portrait of Chris Avellone, a man with dark hair and a slight smile, wearing a brown jacket over a black shirt. The background is a textured, light-colored wall.

## CHRIS AVELLONE



pg 44



# December



pg 35

## HARDWARE 35

### MOTHERBOARDS

Gigabyte GA-F2A85X-UP4 36

### VIDEO CARDS

Powercolor Devil 13 7990 38

ASUS HD 7970 Matrix 39

### SSD

Plextor M5 Pro 42

### CASE

Casecom KK-9949 Hacker 35

Cooler Master CM Storm Scout 2 43

### PERIPHERALS

Razer Deathstalker 40

Creative Soundblaster  
Tactic 3D Rage 42

### CPU

AMD A10-5800K 34

### LAPTOP

Razer Blade 44

## TUTORIALS 69

### ATOMIC.EDU 70

Chris Taylor steps through the Portal and checks out just how Valve is pushing games as an educational tool.

### BOTNETS 72

Luke Millanta delves into the murky world of Botnets, looking at both how they work and what you can do to avoid getting caught running processes for your friendly Russian cybercriminal.



pg 70



pg 90

## GAMEPLAY 75

Need for Speed: Most Wanted 76

Far Cry 3 Preview 80

Hitman: Absolution 82

Need for Speed: Most Wanted 84

Torchlight 2 86

Dishonored 88

Halo 4 90

Assassin's Creed III 92

Medal of Honor: Warfighter 94



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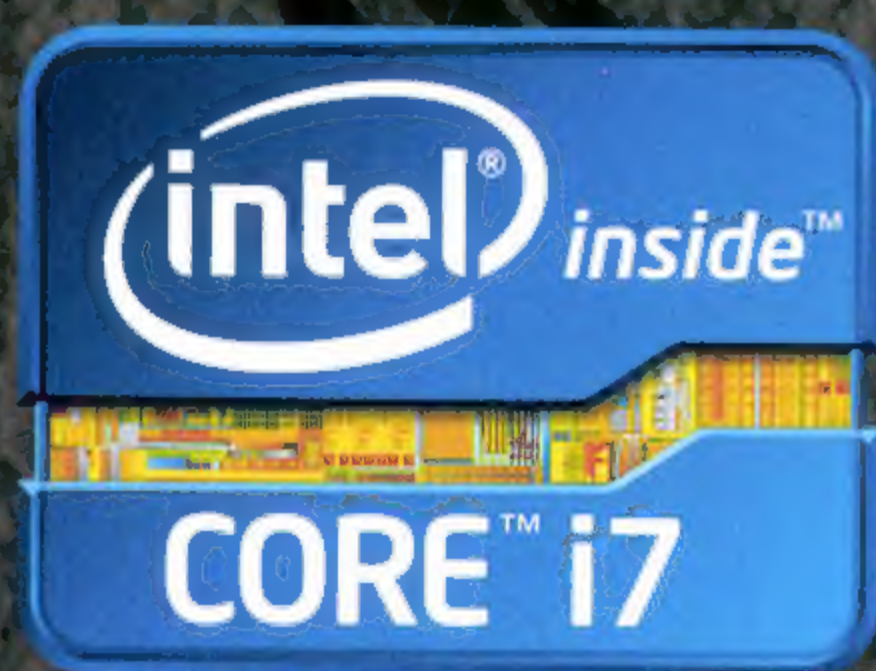
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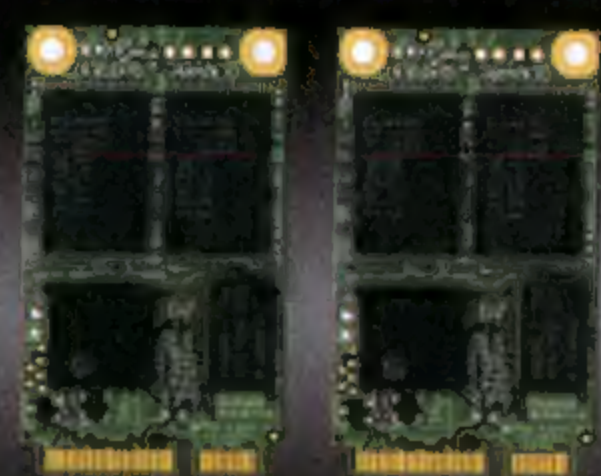


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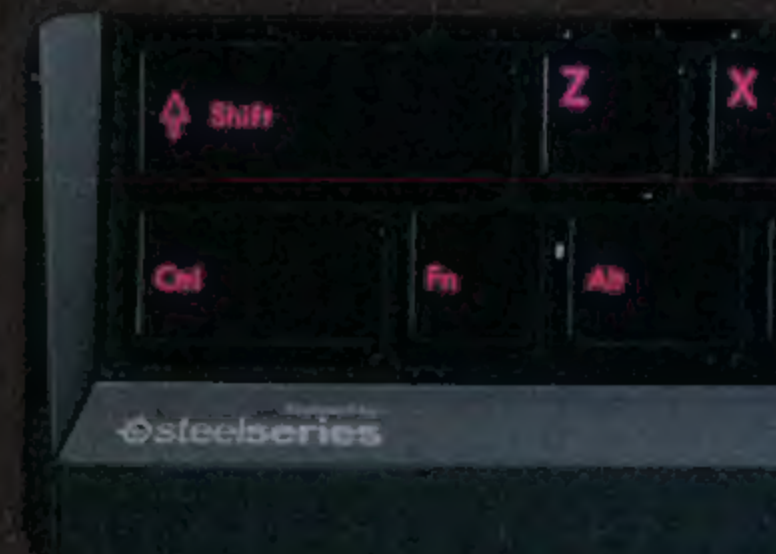
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[www.msi.com](http://www.msi.com)



# Now this is the game we've been waiting for...

Wing Commander and Freelancer creator Chris Roberts returns from movie land with a PC only, crowdfunded space epic that has us giddy with excitement.

It really feels like this week has involved us stepping into an alternate universe when it comes to gaming. This week's best releases all seem to hark back to an age of gaming that is both fondly remembered and nearly forgotten. We have the Looking Glass-esque Dishonored, the fourth instalment in the excellent Walking Dead adventure game and a AAA turn-based strategy title in the form of XCOM: Enemy Unknown.

It is also the week where Obsidian's Kickstarter for Project Eternity has passed 2.6 million dollars, which means an isometric role playing game with all the trappings of the Infinity Engine games of old is going to be with us sometime in 2014.

In fact, the only thing missing from this "old is the new new" revival is a space combat title along the lines of Wing Commander, Descent: Freespace, Privateer and Freelancer.

Or at least that was missing until yesterday, when Wing Commander creator Chris Roberts announced his return to the games industry and lifted the lid on Star Citizen (<http://starcitizen.robertsspaceindustries.com/>), a space combat title along the lines of Wing Commander, Descent: Freespace, Privateer and Freelancer.

There are actually two games being developed by Roberts. The first is Star Citizen, which is a multiplayer universe that is promised to be ever-expanding. Players will be able to follow different paths be it military or merchant, with encouragement for exploring, fighting or trading. The second title will effectively be an offline mode called Squadron 42, which will involve single or coop play through a branching campaign similar to Wing Commander.

Check out the video on the site and you'll get an excellent idea of what is planned for the

games. They will be PC only, running on Cry Engine 3, and looks freaking amazing. Even better for us died in the wool PC gaming snobs, Roberts promises to actually push the PC technologically, something that doesn't happen nearly enough (and is frankly impossible when it comes to multi-platform development). The video alone has both David and myself giddy with excitement, and we'll both be throwing money at Roberts so he can make it happen.

We say that because the game is being developed with a crowd funding model in mind. Unlike everything else this year, this isn't a Kickstarter focused effort, but rather it involves giving money directly to the developer. There are a pile of tiers available, which will give access to ingame titles and ships, as well as alpha and beta access to the games themselves.

Just like Kickstarter getting financially involved is a risk, and not a traditional pre-order, with the final game still two years away. But to Robert's credit he has begun the process a year into development, which means that there is already something to show in the form of the videos. Speaking of which, you should really set aside 12 minutes to check out the full video from Roberts (1km long carrier, yes please!)



Well, as you can probably guess, there's a bit of sadness around the joint for this POTM, but you know, it's kind of hard to feel totally bummed out – we still have our forums, we still have some great posters, and when it comes to POTM, it's always a fantastic chance to give something back.

So let's celebrate, guys. This month, we're giving away our Razer goodies to...

## p0is0n!

For his BIG POST on teeny microservers. Well done you toxic dude, you!

<http://forums.atomicmpc.com.au/index.php?showtopic=51359&st=0&p=1029782&#entry1029782>

And we also have a couple of runners up.

**Opy** gets the nod for, uh, a tank. Made of bacon. Really.

<http://forums.atomicmpc.com.au/index.php?showtopic=41565&st=4260&p=1041985&#entry1041985>

And **SquallStrife** gets all meta, describing how the POTM nomination process works.

<http://forums.atomicmpc.com.au/index.php?showtopic=51885&st=0&p=1041136&#entry1041136>





# Wolfenstein movie announced... Again...

That guy that wrote some of Pulp Fiction is working on a script for Wolfenstein, which is totally different from last time.

During those quiet moments in the Atomic offices, we often fall into discussion on games, and the wider issues that have accompanied the rise of our little hobby into the entertainment juggernaut that gaming now is. We whistfully speculate that what the world needs is a new No One Lives Forever, or whether the attachment of Michael Fassbender will make the Assassins Creed films good.

However wide ranging the conversations are, no one has ever uttered the line "you know, what the world really needs is a proper Wolfenstein movie".

Even in a crazy alternate universe where that line was uttered, the followup would hardly have been "Hey, wouldn't it be even more awesomer if that Wolfenstein movie was written by the guy that wrote the Silent Hill movie - he worked on Pulp Fiction you know!"

Thankfully there are others in Hollywood with a much more refined sense of vision than us Atomic staffers, and work has indeed begun on a Roger Avary script for a Castle Wolfenstein movie. According to Variety, the movie is being spearheaded by the producer of the Resident Evil movies, Samuel Hadida, whose description of Avary's involvement deftly ignores anything the writer has done under his own steam

"With Roger at the helm, we expect everyone will join us for a wild and fun cinematic ride that will grab contemporary film audiences with the same irreverent, hip, over the top approach that Roger brought to 'Pulp Fiction' and the other films he has either written or directed,"

Add to this the description of the movie (which is to be a buddy flick featuring an American and a British soldier) as being in the vein of Captain America and Inglorious Basterds and you have a recipe for something that could be truly, truly awful. And we bet that they'll wimp out on the inclusion of giant robot Hitler as the final baddie.

If this all sounds a little familiar, it is because it is. Variety reported almost the exact same story back in 2007, when the same producer and writer announced they were beginning work on an adaptation of "Return to Castle Wolfenstein". Considering that it has gone nowhere since then, we can't help but treat the latest announcement with the scepticism it deserves.

The only redeeming feature for now is that there is no timeframe for the movie, and will likely fade into production obscurity alongside Sam Raimi's World of Warcraft adaptation. Or at least it will until Variety digs the story up again in five year's time.



## PAX Australia: it's coming to Melbourne!

The biggest gaming and entertainment expo Australia has ever seen will take place in Melbourne for at least two years running.

It might be one of the worst kept secrets in Australian gaming, but now the news is out - PAX Australia will take place in Melbourne.

Victoria's Minister for Innovation joined Penny Arcade President Robert Khoo to make the announcement today.

"This is the first time the event has been held outside the United States and attracting PAX Australia to Melbourne was a major coup for Victoria," Ms Asher said, via a release. "It is a great opportunity to showcase games culture in Australia to the rest of the world, and the exposure around the region and the world that Melbourne's games industry will gain from the event, and the number of international and domestic visitors that will be drawn to Melbourne, cannot be underestimated."

"Melbourne has a long history of supporting the games scene, through showcasing cultural game exhibits to supporting world renowned



game developers," Khoo added. "Holding PAX Australia in Melbourne is the perfect fit for our show."

The first event's scheduled for July 19-21, and will feature local and international guests from all aspects of gaming and our community. Tickets for each day are only \$45, with a three-day pass costing \$115.

For more details, including registration, check out the official PAX Australia site (<http://www.paxaustralia.com.au/>).

## Carmageddon is back - on iPad!!!

If running over innocent civilians in a hotted up death machine is wrong, I don't want to be right (or, technically, considered sane).

Being the horrifically and anally politically correct person that I am (or, at least, that I am constantly told I am), I kind of wanted to dislike Carmageddon when it first came out. Then I made the mistake of playing it, and, well, I had a ball.

It was bloody, yet somehow innocent fun. From a simpler time. And it was banned in more countries than you can poke a blood-smeared fender at.

However, it's now back in a big way. Not on PC and Mac, like it was originally (back when games coming to Mac was a big thing), but on iOS!

Yep, the game's out now.

It's the complete game as it once was, with pedestrian fatalities, power-ups, cops to avoid and/or destroy, and a range of vehicles to unlock, and lots more features beside. Hell, why am I even writing this - I'm downloading this now!



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[alienware.com.au/m18x](http://alienware.com.au/m18x)

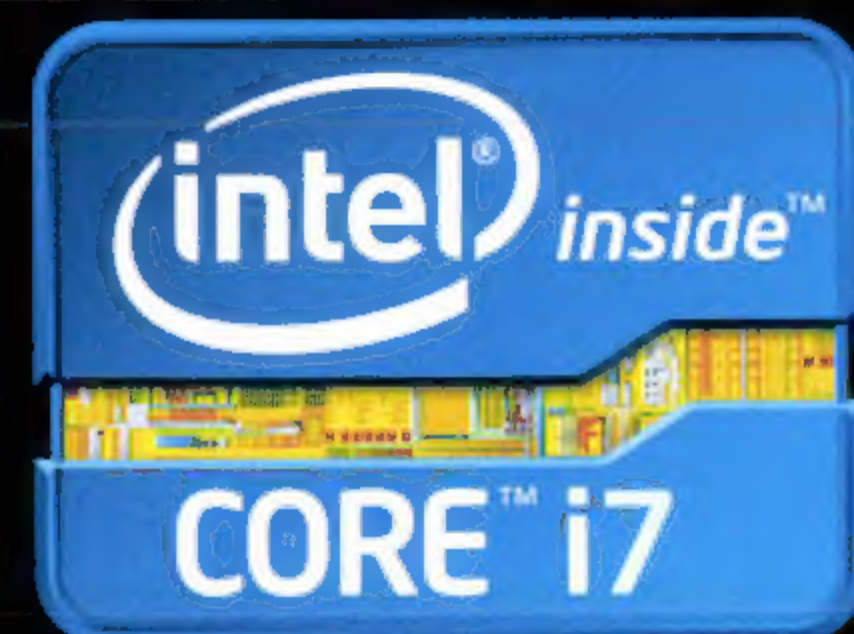


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# MODIFICATION

With Ashton "Two mods are better than one" Mills.

## Pirates, Vikings and Knights II

Game Half Life 2  
URL [www.pvkii.com](http://www.pvkii.com)

**M**ultiplayer FPS games are the lifeblood of online gaming – we need only think of the hallowed Counter Strike and the bagazillions of players the game *still* has after all these years.

But many of these games, whether it's CoD, Brink, NeoTokyo and everything in between, tend to get a bit stale. After all, they all operate on the same premise: guns, guns, guns!

Yawn. So last century.

Feel like mixing it up? Cast ye scarred eyeballs towards Pirates, Vikings and Knights then, for it too is a multi-player kill-all-your-friends game with the distinct difference that guns are not the only way to gib someone. Nay, you have a plethora of new and less-gunpowder-based weapons to choose from!

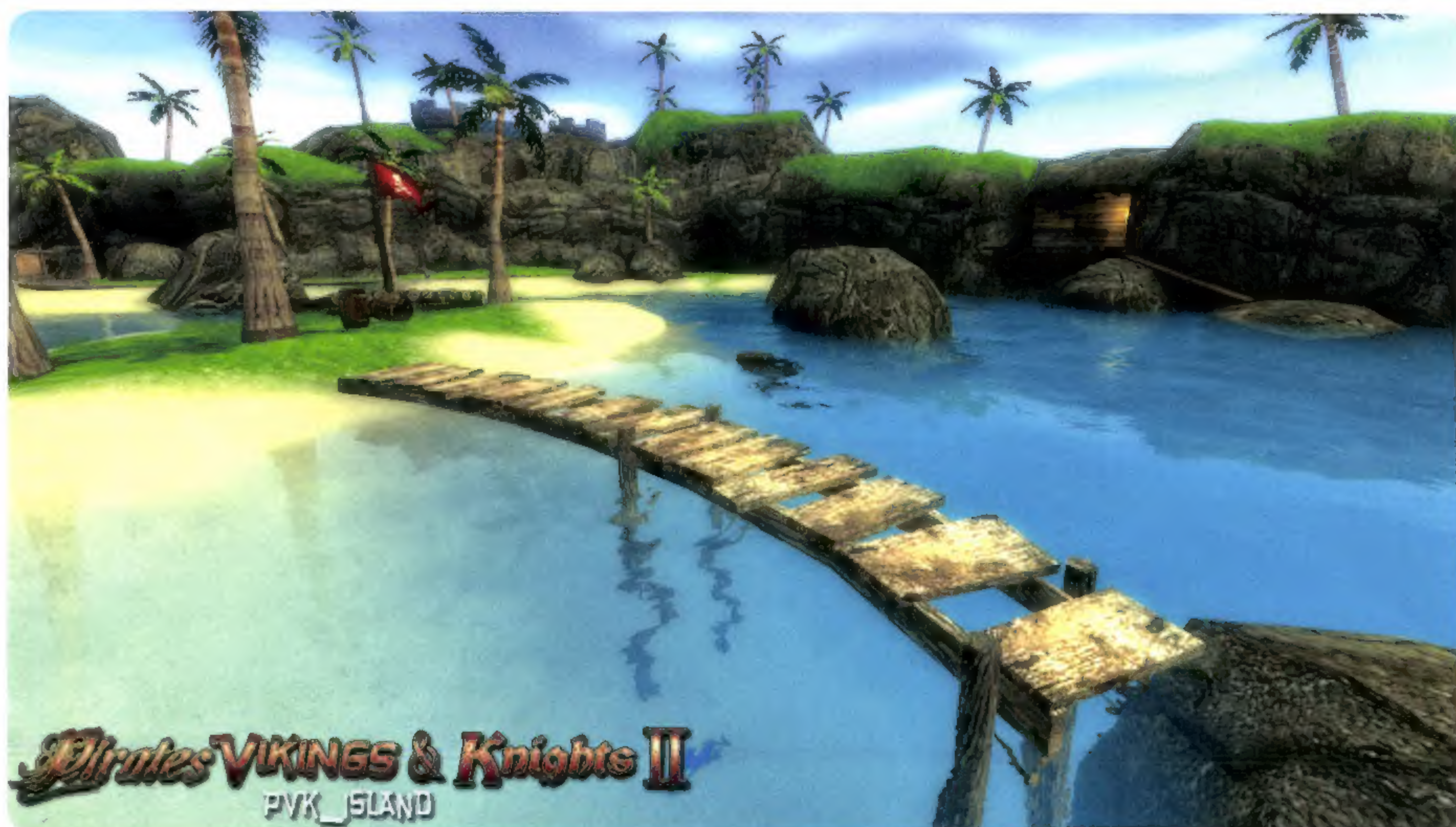
Pirates, yarr, love a bit of cutlass, hook and bomb-blasting powder-keg!

Vikings, blood-smeared and raving wildly, prefer the sword, axe and pinning foes to walls with spears!

And Knights? What else but broadswords, shields and crossbows to rid the land of heathens!

But if you *really* want your new-fangled boomstick weapons, there are still a few you can latch your scurvy mittens around – flintlock pistols and the blunderbuss among them.

Each side has their own unique classes and special attacks, and as melee features heavily PVK has its own melee system that includes parrying, shield blocking and counter-attacking. Fights are still quick, but there is a real skill to



master so it's rewarding as you play the learning curve.

Most important of all, however, is remembering that this is a three-way fight – none of this 'terrorists vs counter-terrorists' duality. Stick a sword in that dastardly pirate, blow the limbs of a viking, or bury an axe into that well-armored knight's noggin! And all the while capturing territory, wiping out all other teams, or playing the unique Booty and Trinket War modes.

About the only side that appears missing is those sneaky Ninjas... but otherwise, this mod covers all the bases. And, naturally, PVKII is a free mod for Half Life 2 and since *everyone* has Half Life 2 then you know what you need to be playing this weekend.

Yarr!



# ME1 Texture updates & improvements

Game Mass Effect 1

URL [www.moddb.com/mods/mass-effect-1-new-texture-updatesimprovements-mod](http://www.moddb.com/mods/mass-effect-1-new-texture-updatesimprovements-mod)

If you haven't played the Mass Effect series the first game is, well, a good place to start. But if you think the graphics look a little dated compared to Mass Effect 3, there's something you can do about that.

The ME1 texture updates and improvements mod brings it forward into the future a few millennia with new higher-res and more detailed textures for all the main characters in the game along with most NPCs, armors, and key elements like the Normandy. Light and shadow maps are also improved, and swanky new film-grain texture improves on the original for that 'movie-like' feel (though, personally, I disable this in-game – why mar an otherwise beautiful vision?)

Note that, if you remember, Mass Effect isn't easily moddable. Not only did Bioware not release any modding tools, it made it nigh impossible to alter original game

files. But where there's a will there's a way however, and mods for the Mass Effect series use a nifty tool called TexMod that replaces the texture *in memory* on the fly.

So you first need to install TexMod (a link to which can be found on the above page) and then download and run the LAA (Large Address Aware) patch, which is all but a must these days for games that use high-res textures (you might remember Bethesda patched Skyrim soon after release to be LAA to reduce crashes caused by running out of memory). Finally, install the mod and follow the instructions in the Readme. Note you do need at least a 4GB machine with at least a 1GB VRAM GPU. The full pack download is 700MB compressed.

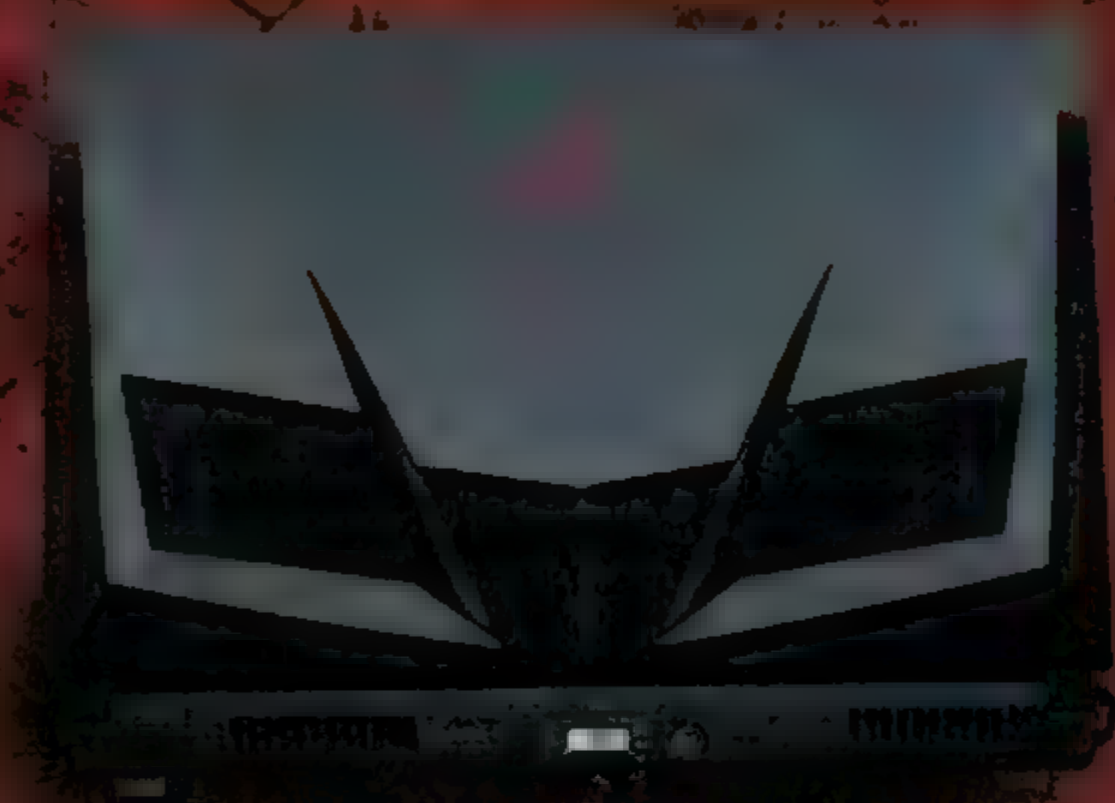
All up, while it's not close to the beautiful graphics in Mass Effect 3, it holds up remarkably well with the addition of an updated texture pack.



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## MAG II controller

**Price: \$149.95** Website: [www.magcontroller.com](http://www.magcontroller.com)

I'm not sure that anyone will ever come up with a better way to headshot complete stranger on PC than with a classic mouse and keyboard combo, but it's always nice to see folks trying something new.

And that certainly describes the MAG II.

It's not a lightgun, which is a plus, instead combining motion sensing and gyroscopic technologies to track your movement. There are three sensitivity settings, and ongoing support for the product from a team of engineers, who'll be constantly updating the MAG II and adding new functionality.

It looks a bit naff, but if you've got the room to sit back and actually snipe at your PC (and PS3, if you're that way inclined), then this could be an interesting alternative – if a slightly silly-looking one.



## Suitjamas

**Price: \$89.95** Website: [www.suitjamas.com](http://www.suitjamas.com)

I know it's often tempting, when deep into the tenth hour of a massive gaming marathon, to give up on looking respectable and go for the tracky-daks or even some PJs... But come on, gamers – we can be comfortable and look good too!

In fact, we can suit up – in suitjamas!

Inspired by *How I Met Your Mother*, these four piece pajama sets (pants, shirt, jacket, and clip on tie) are the ultimate in smart casual. And, I can personally attest (check out my ed pic – of course I bought a pair!), they are very comfortable for gaming.

And lounging, and drinking, and...



## Buffalo MiniStation Air

Price: \$289

Website: [www.buffalo-anz.com.au](http://www.buffalo-anz.com.au)

Storage on mobile devices has certainly come a long way, but it's still annoyingly easy to run out of space on a smartphone or tablet after a hundred albums and the odd movie or twenty.

That's where Buffalo's new MiniStation Air comes in.

The Air offers a smartphone and tablet-busting 500GB of storage in a sleek chassis designed to fit into a large pocket or bag. Your phone or tablet – of either Android or iOS variety – then uses a dedicated app to access the drive wirelessly. With USB3 functionality, it's pretty fast getting material onto the drive, too.

It can also be used as a mobile backup device, and can manage up to three connections to mobile devices at once.



## Gordon Freeman action figure

Price: \$US19.95 Website: [www.thinkgeek.com](http://www.thinkgeek.com)

Okay, so it's not looking like we'll be getting Half Life 3 (or even HL2: Episode 3) any time soon.

But that doesn't mean we can't have a little bit of Gordon Freeman in our lives. Or, more accurately, on our desks.

This impressively detailed 7in action figure features the famous Black Mesa scientist in his HEV suit, with a gravity gun, bugbomb, and of course his trusty crowbar, as well as a set of optional hands. Of course, what would Gordon and a crowbar be without a headcrab to smash?

Thankfully, one of those included too. Just... watch that little guy – if you have other toys around, he can get mighty... bitey.

## Epson EH-TW6100 projector

Price: \$2799 Website: <http://global.epson.com>

Having a good, HD projector is kind of every geek's dream. For watching great movies on almost cinema-scale, for playing games at giant and ungodly sizes, and – generally – showing off your e-peen to all and sundry.

Epson's got a whole range of projectors just come out, and they're all 3D-enabled. The cheapest – but still mighty serviceable – is the EH-TW6100.

It features full 1080p projection, a built-in wireless HD receiver, and five HDMI inputs for multiple devices – TVs, consoles, whatever! With high colour colour brightness and an excellent 40,000:1 contrast ratio, this is a great basic projector, and it comes with two pairs of rechargeable 3D glasses.



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# fractal

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This X-ray may not help, but it will teach you a little bit about the interaction between technology and the stockmarket.

**N**o matter what you do, no matter how much you know, no matter how hard you try, someone will always know more, or do better. Depressing, isn't it?

It's true of many things. Unless you are someone or something absolutely exceptional, there is a fair likelihood that there is always someone in the world with a competitive advantage over you, in some way.

Now think about those advertisements you see on television about stock options trading and foreign exchange trading companies. The statements always say something like:

"Are you the kind of person who thinks about the events behind the events?"

This statement means that, in theory, stock market shifts, large booms and large busts in company values often occur as a consequence of world events, decisions and knock on effects. There is even an element of chaos theory in all of this.

This month, X-Ray is going to look into the topic of the high frequency trading game and the computing technologies that make the stock market go around. You may not become rich just by reading X-Ray this month, but you'll indeed gain an appreciation for how some people become exceedingly wealthy through the judicious use of technology.

### Quantity over quality

The concept of High Frequency Trading (HFT) is a relatively new one. It uses very sophisticated

high performance computing technology and algorithms to trade on the share market very quickly (far faster than any human can make decisions). Much of the time, the users of these systems have a proprietary and well kept confidential trading strategy, which is converted into a form of algorithm, or types of heuristics for a high performance computer to sift for patterns in.

An investment decision may only be held for seconds, not hours, days or years. On this basis decisions change very quickly, as do market outlooks.

The reason the speed of the transaction matters and the latency of the discovery counts so much, is because of the enormous competition that exists between HFT groups. Making even cents, or fractions of cents in an instant, with this frequency of trading can mean the difference between millions of dollars at the end of a day and nothing. The strategy is to capitalise on tiny market changes or micro events that raise or lower the value of a stock (if only by a fraction) and then sell or buy on that basis – even if the sell or buy might be within the space of a second or two of each other.

### Faster than the speed of wire

One has to wonder how all this is achieved, when such low latencies are required and every microsecond counts.

Obviously, very fast computers are required and very fast networks – but these systems are a different breed of technology than anything we've discussed before in Atomic. They aren't just super computers or high performance computers. They are another category of device known as ULLDMA systems, or Ultra Low Latency Direct Market Access systems. One could easily misinterpret this to mean "Direct







## Two particular technologies are standing out as front-runners in the micro-second, micro-transaction wars of the stock exchange...

Memory Access" as well, as the concepts and internals of these systems are similar.

ULLDMA is a set of technologies mixing hardware and software platforms that are part of the HFT trading strategy mentioned previously. ULLDMA is regularly combined with algorithms that bypass a human broker and their discretion or decision-making abilities (which may not be as fast as a computer, as ambivalent or as rational).

### The hardware behind the money

To do all of this and to do it in a competitive way, hardware has to be extremely low in latency and extremely high in throughput credentials. Traditional networking as we know it (Ethernet, 1GbE Switching, normal NICs and general TCP/IP principles) doesn't offer what these low latency transactions require, nor do they perform anywhere near the mark that is required to remain competitive in this oftentimes chaotic, hyper-fine-tuned world of transactions and changes, where the difference between making and losing significant amounts of money might be the measurement of 3µs (three micro-seconds, or three one millionths of a second).

Traditional Ethernet, copper switches and TCP/IP protocols over wire are problematic for a few reasons. The protocol does not lend itself to low latency transfers, in its most simplistic form. Further to this, with traditional switching technologies, the lowest of which has been cited by Mellanox at around 38µs and the highest of which has been cited by QLogic at around 125µs, are not made for these sub microsecond workloads. There are a number of reasons for this.

Some of it is intrinsic in the transmission medium, in the form of copper wire, noisy endpoint terminations, simple, low powered switching devices and CPUs in the routing or packet forwarding infrastructure, and the datagram/packet architecture of the protocol itself.

Of course, there are mitigation techniques that attempt to make standard Ethernet and TCP/IP a better and more sensible protocol for low latency communications. One technique is Nagle's algorithm, known famously as "RFC 896".

The algorithm is a means to improve the efficiency of TCP/IP by reducing the number of packets that need to be sent over a network. The document and RFC describe what is known as the small packet problem (a famous problem in computer science and network engineering). If an application continually sends out or receives

many small packets (if only a few or one byte in size), it's not very efficient. The problem with standard TCP/IP packets is that they are 40 bytes in size, inclusive of headers. (20 bytes for TCP, 20 bytes for IPv4 protocol control). This results in a 41 byte packet that is unfathomably inefficient.

The idea behind Nagle's algorithm is that it would work to gather a logical group of packets, then send them together, heterogeneously, rather than little single packet (inefficient) bursts at a time.

To this end, as it was a very early RFC in the TCP/IP world, many switch designs and routers complement the idea of Nagle's algorithm and the idea of delayed acknowledgement. Unfortunately, these concepts interact very badly with real time computing scenarios or extremely low latency application requirements. As a consequence, another flag known as TCP\_NODELAY is required to bypass the protocol RFC that implements Nagle's algorithm, where bandwidth is sufficient and real time communication is mandatory.

Picture yourself in a heated game of a hotly contested FPS map, or running around with a group of guild-mates in a large raid that has been meticulously planned out. You're all generally using voice communications to do this. Consider what might happen if RFC896 is in use. Packets that you send (audio, voice communications, SIP, VoIP etc) might end up waiting or amassing until such a point where the algorithm will decide to send said packets. That doesn't work so well for real time communications.

### Out, damned latency!

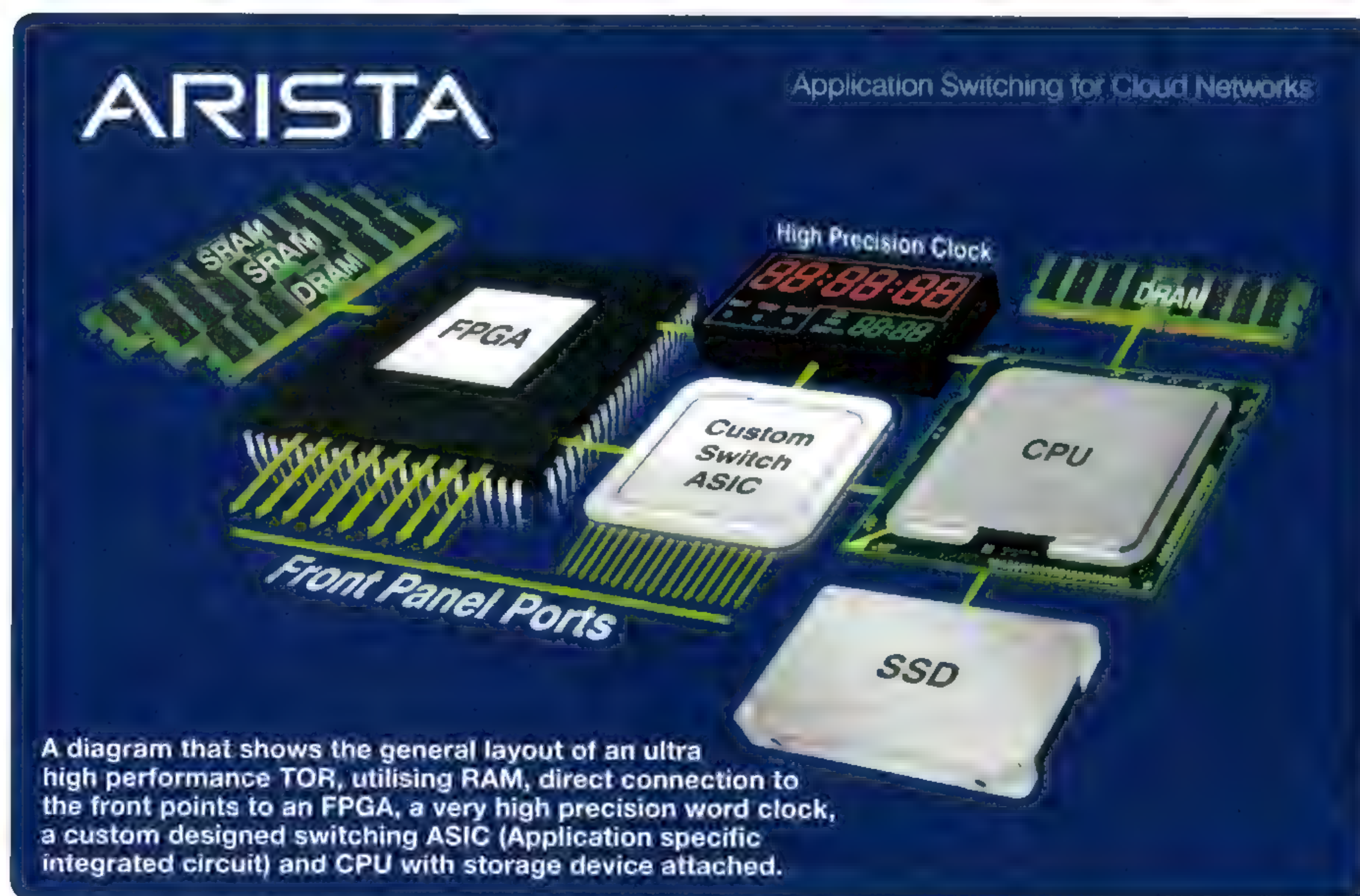
As one might expect there are some very specialised bits of hardware available (for those that can afford it) to help reduce these latency issues. Two particular technologies are standing out as front-runners in the microsecond, micro-transaction wars of the stock exchange created by HFT.

Without fast switches, it doesn't matter how fast our NIC's and compute-servers or storage



The Gnodal GS7200, a 10GbE top of rack optical switch with a sub 150ns latency benchmark.





## The anatomy of these cards isn't any different to what one might find in standard communication server or high throughput HPC host...

actually are. Switches like the GS7200 and Arista 7124FX pack extremely dense FPGA (Field Programmable Gate Arrays) inside to transport packets in and out at 'wire speed' across the integrated circuit.

These constructs are the small highway in which packets of data (which might represent tens of thousands of dollars in transactions per second) fly across the trading room floor.

These very highly specialised switches are a way to get packets out the door and to the next

room, metro area network or office block, but getting them out of a compute-farm or server quickly is another challenge.

### You're NICed

In order to drive down communications latencies to the levels that are acceptable in the HFT world between compute hosts, the PCI-E bus, the TOR switches and the outside world (or the next server in the rack), require specifically engineered silicon.

There are several vendors who engineer very

specific low latency communications risers for the primary purpose of low latency and high throughput. The industry trend in HFT is to use optical 10GbE network interfaces for Ethernet.

Several companies have solutions in this space including Altera, Terasic, Enyx and Mellanox (non exhaustive list). These companies offer latencies on-die as low as 1.2µs per operation. Enyx even go as far as offering a device they simply call the "Market Data Acquisition Card".

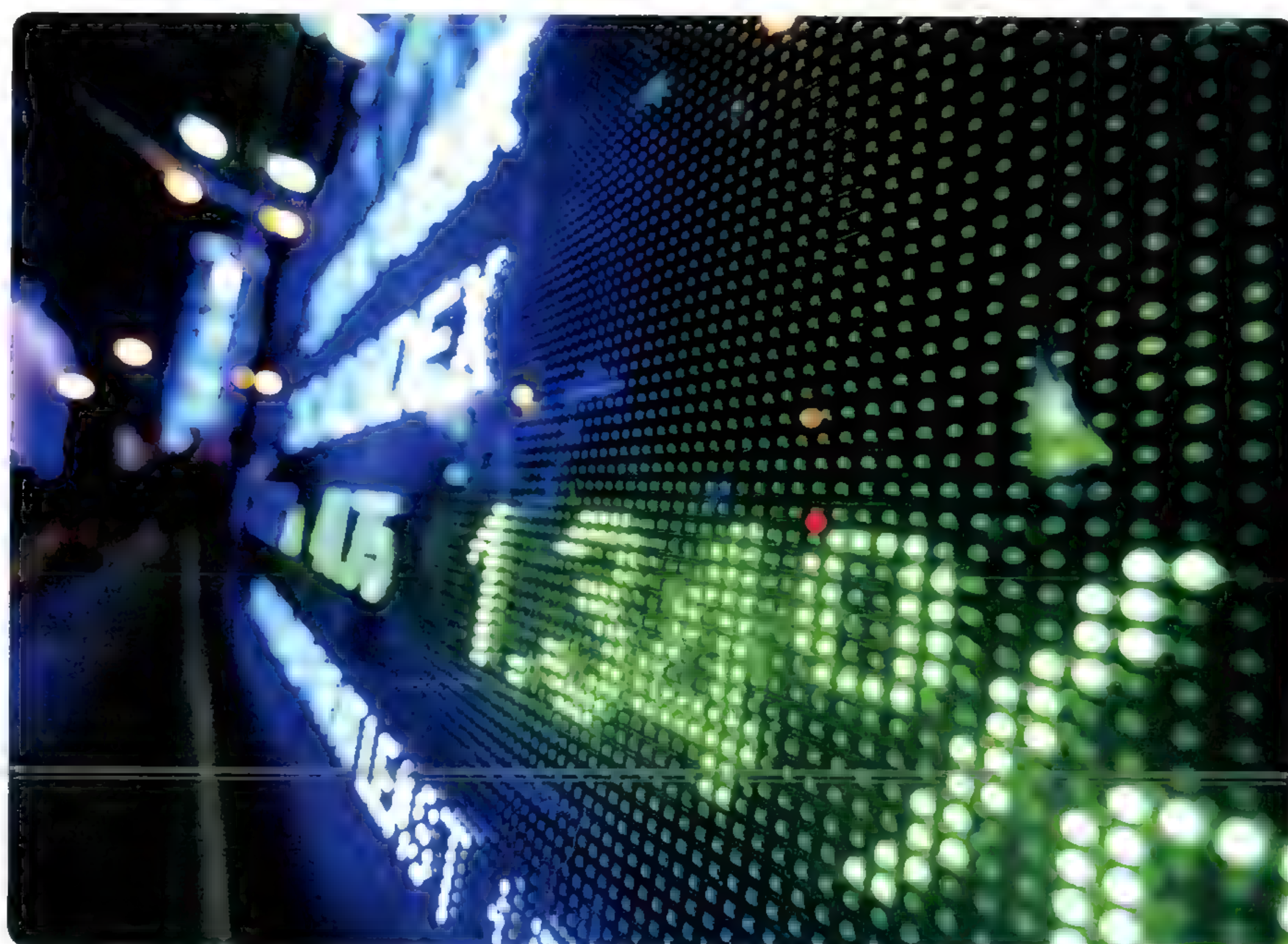
The anatomy of these cards isn't any different to what one might find in a standard communication server or a high throughput HPC host, except for some of the logic programmed into the FPGA on board. Here, we see a strange trend emerging.

## First hardware, software. Now hardware again.

Many years ago, when fledgling organisations were building the first high performance computing systems, everything was done with customised silicon and integrated circuits. It was all done via ASIC. This was expensive, time consuming to design, proprietary and required a lot of resources.

Decades went by and with the advent of x86\_64 systems being so powerful, so parallelised and so multithreaded, the industry moved away from doing everything so heavily in 'hardware'; rather, the trend was to put things into software and rely on the very fast CPU (Intel, AMD, ARM, SPARC) plus the OS to do the rest.

Times change, however. As with any progress within technology, innovation, a chance to gain market acceptance, competitive behaviour and ruthless trading tactics have pushed companies back into the more obscure world of FPGA and ASICs. This has been done for a few reasons:





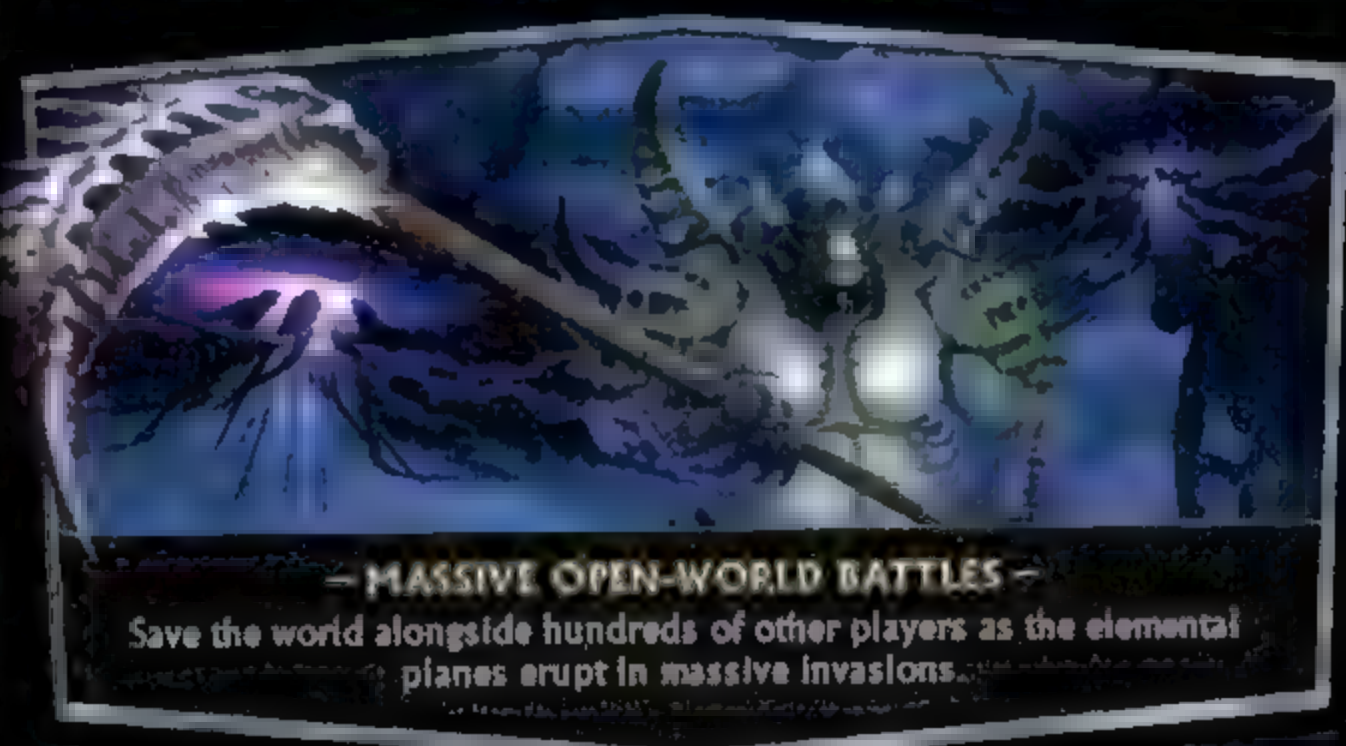


# RIFT

## STORM LEGION™

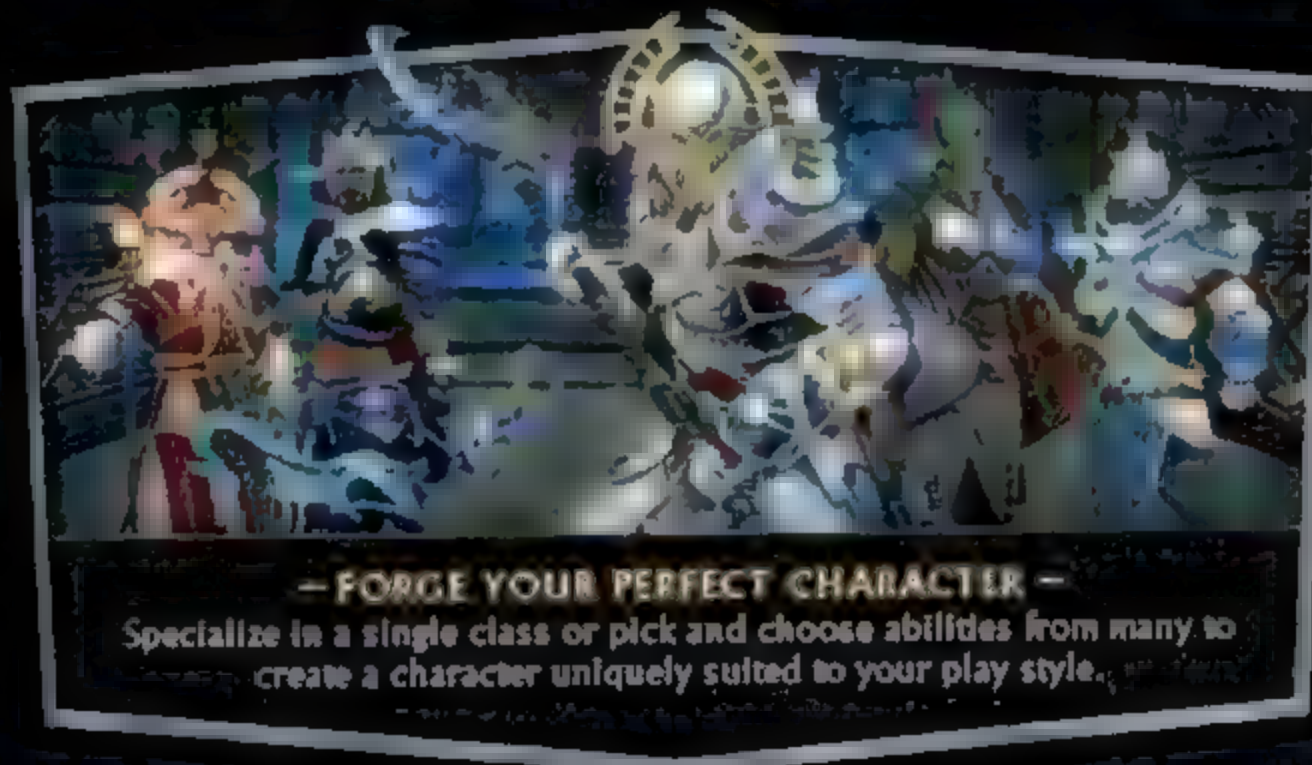
# PREPARE FOR THE STORM

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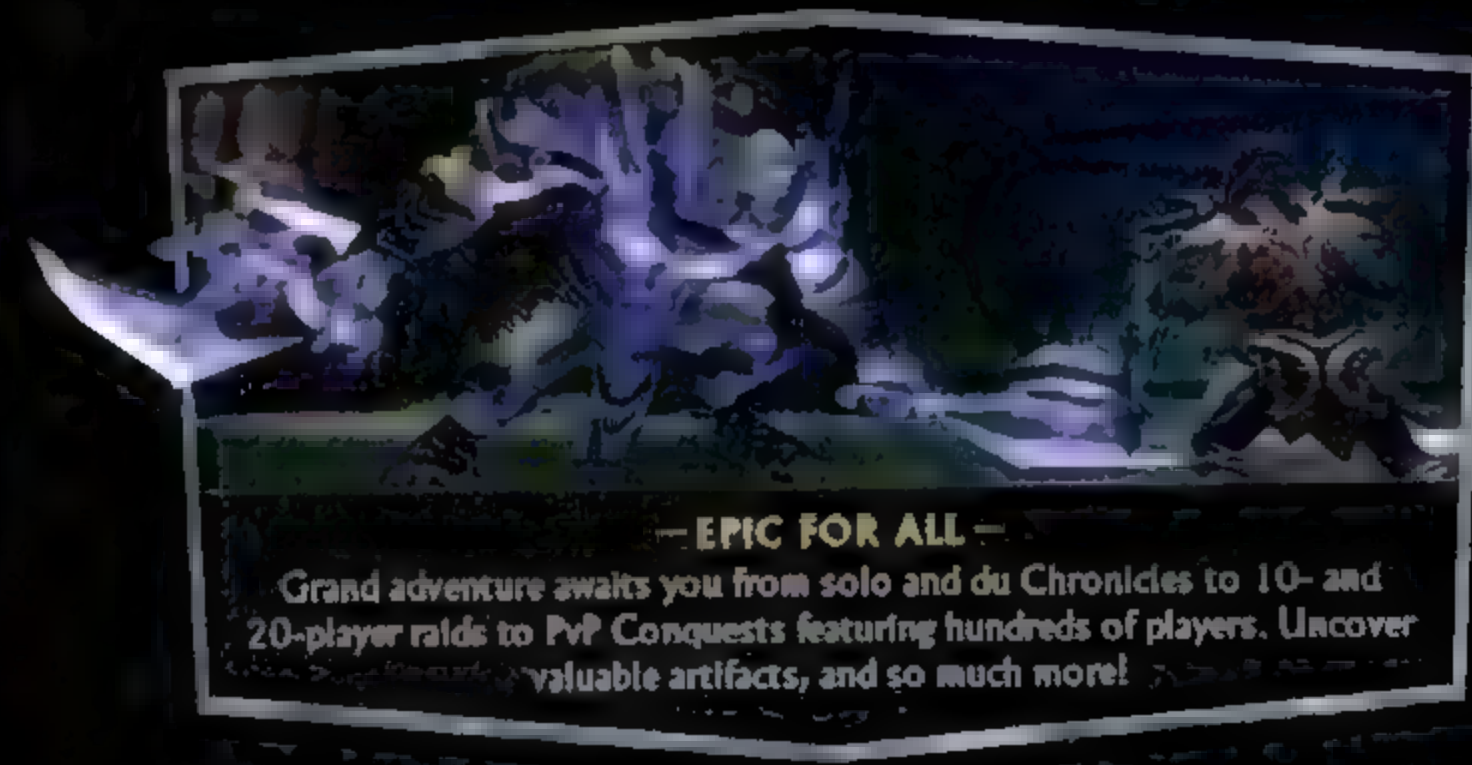
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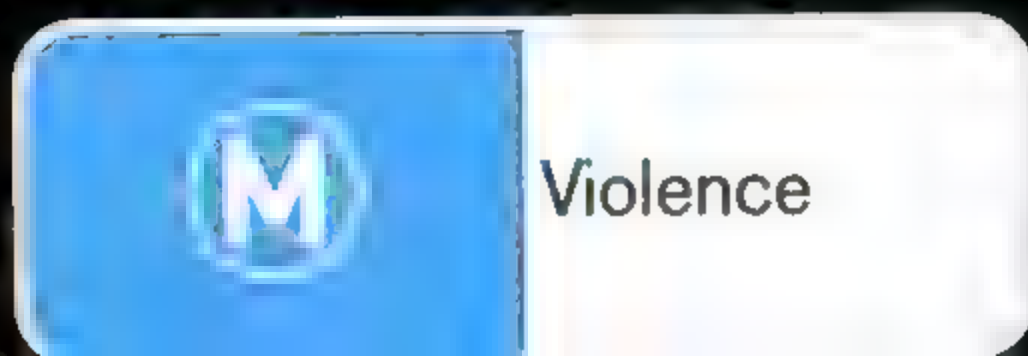
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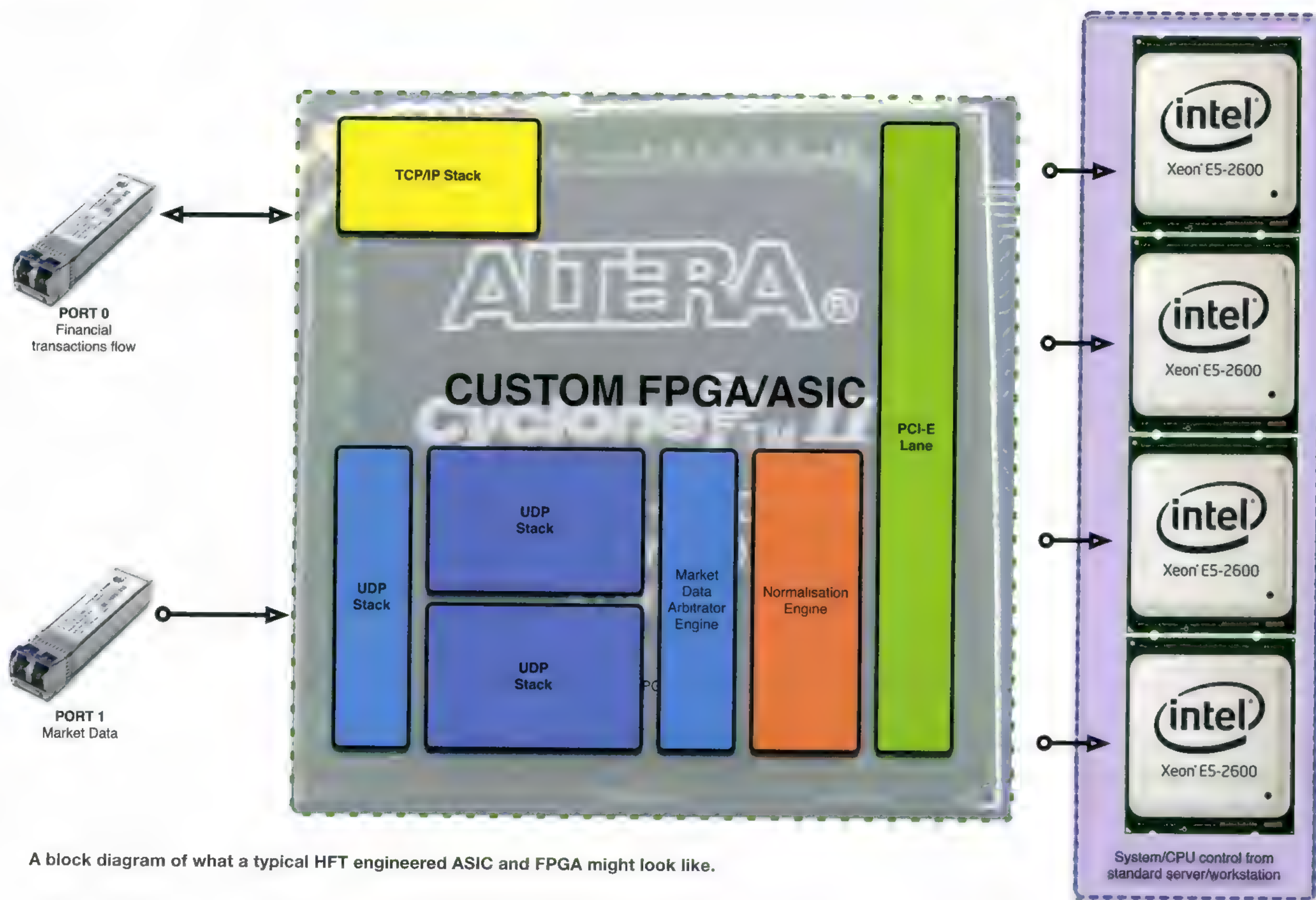
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# TRION™





A block diagram of what a typical HFT engineered ASIC and FPGA might look like.

1. On an ASIC, a company can implement their own code and technologies to do, effectively, whatever they like. An x86\_64 has a known, standard set of instructions.
2. If you can build an ASIC and FPGA, you can put what you want in it – and don't have to disclose to anyone how it works. It's confidential and not published. As a consequence, if what you've got is faster than what everyone else has, they'd need to pay you or come to some agreement to use the same technology to gain market-dominance or a competitive edge.
3. ASICs and FPGAs by design can be implemented in a more efficient way than a standard commodity CPU because they only need to carry out very specific tasks. They are not a utilitarian device that does many things at an average speed. They are a highly specialised device that does only a few things at extremely high speed.

## ULLDMA and RDMA

Something that the hyper-observant readers would have noticed already is the lack of discussion about Infiniband (IB) in this market. It's well known that the very lowest of latency devices in this market (networking, IO and throughput)

high performance computing market but is increasingly seeing utilisation in the media and engineering industry. Infiniband's core competency is its ability to use RDMA, or Remote Direct Memory Access.

The premise behind RDMA is that an appropriate interface can access the memory of another device (two servers, or a server and a switch, or a switch and a network card) without ever having anything to do with the operating system or kernel (which creates overheads).

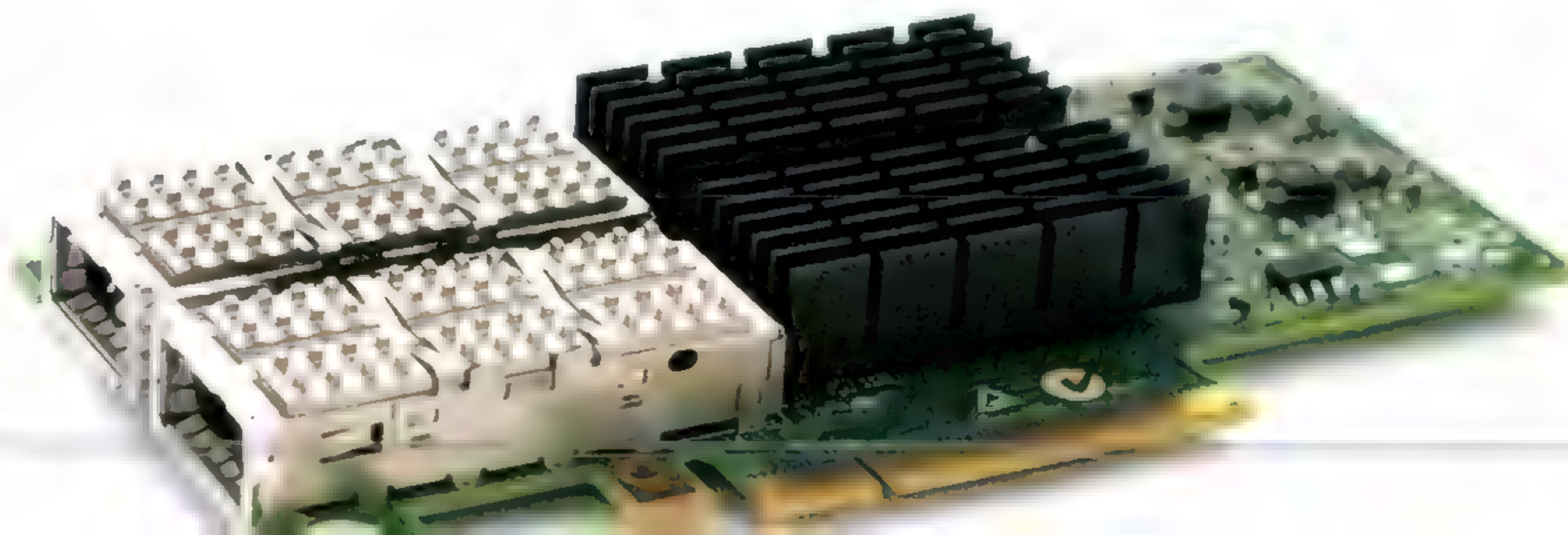
One would expect this to be very attractive to the HFT and financial market sector, but it's not panned out that way. Potentially, this is as a consequence of only two or three companies being able to manufacture IB and the standards being open to all. This may well be why the

market remains closed off, with proprietary 10GbE silicon being used instead.

Other mechanisms of delivering RDMA are being developed, however, in the form of RoCE (pronounced "Rocky") or RDMA over Converged Ethernet, effectively allowing for RDMA and close to Infiniband-like latencies over normal Ethernet systems.

This has been a brief glimpse into the world of high frequency trading and the unique hardware and tolerances the people and machines of this industry are ruled by. Next time you see the NYSE on television and you witness all the people on the trading room floor jousting for a buy or a sell, keep something in mind.

In your own lifetime, all those individuals might be replaced by an algorithm.





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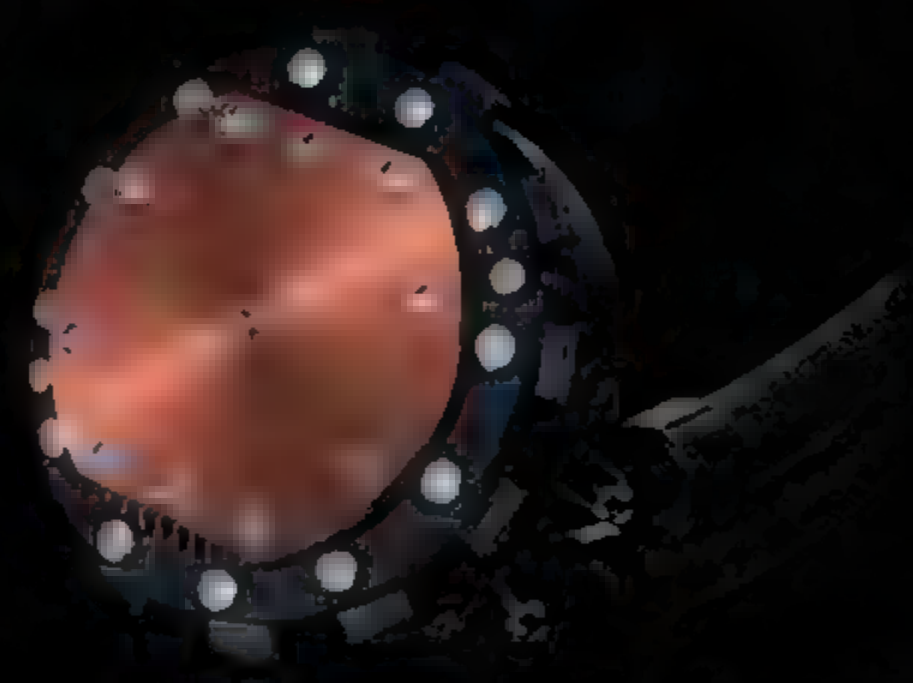
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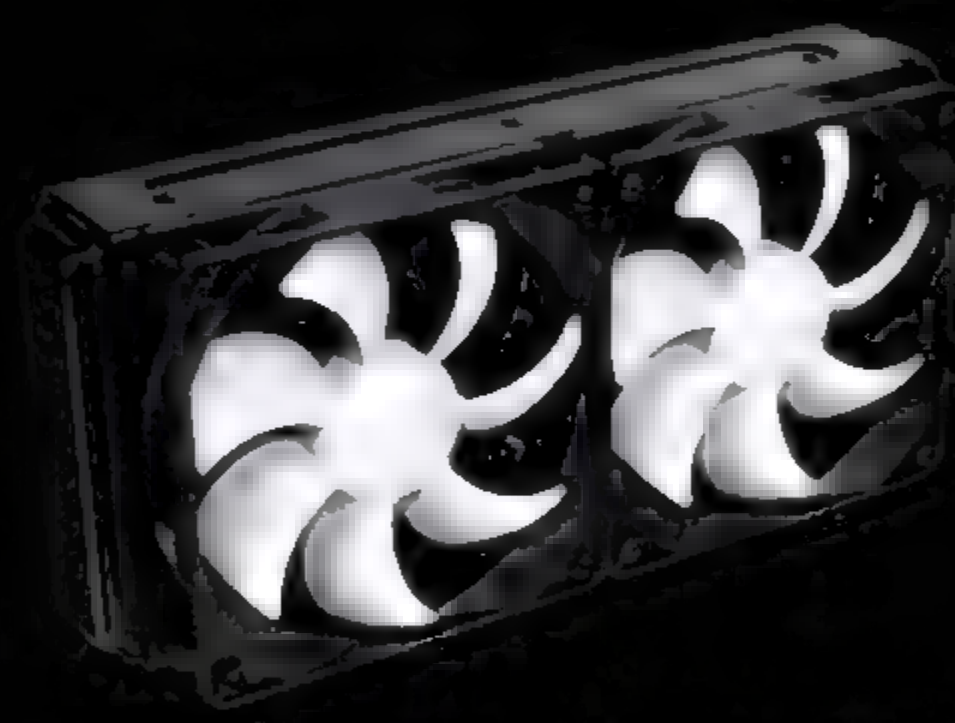
## Features



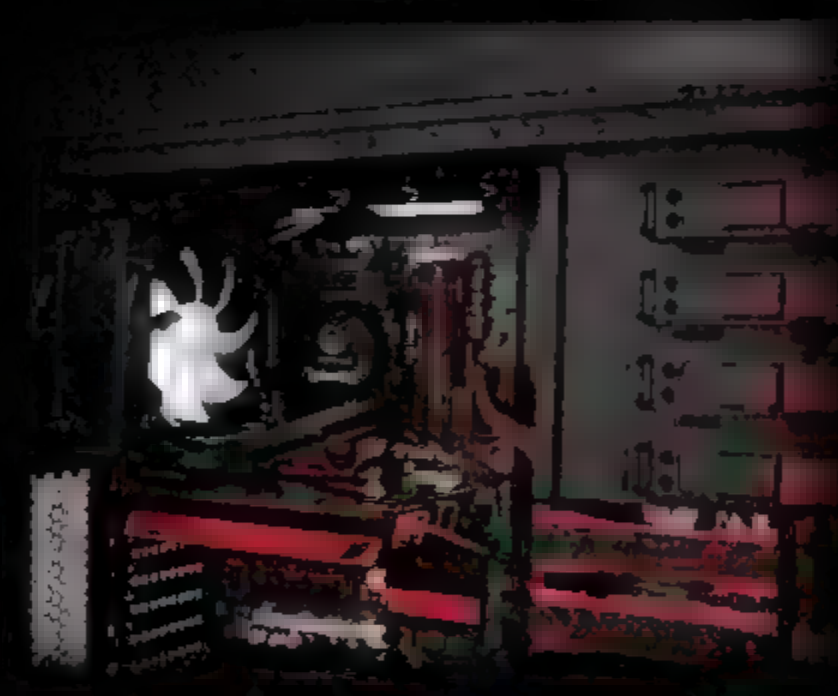
Flexible Tubing



Universal Socket Support



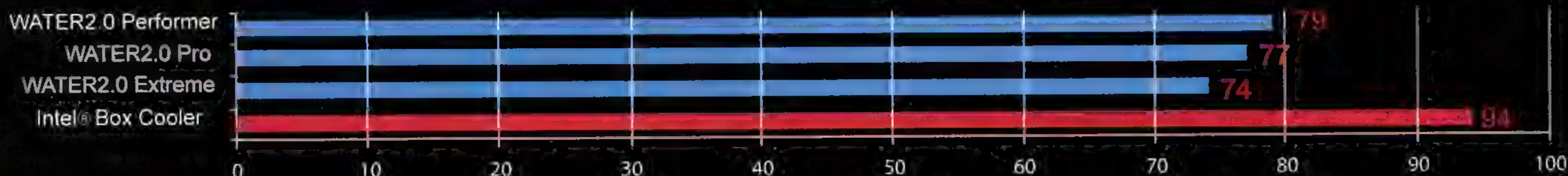
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Performance Comparison (Core i7 975 @ 4.0Ghz 100% Loading)  
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# INPUTOUTPUT

Dan Rutter brings the answers to your questions like no-one else can.

## I/O OF THE MONTH

### The accidental spammer

**I** I think my Google Apps account may have been hacked. All I use it for is my email, so I can have john@johndoe.com.au as my address (my name is not actually John Doe, please don't publish my real name). Suddenly now I'm getting lots of "could not deliver" errors for weird addresses all over the world that all say I tried to send them spam in Japanese which, according to Google Translate, is about some kind of satellite TV decoder card.

Since I only hear about the spam that bounced, and I got 78 of them just today, I presume the spammer's sent a lot more than that. How do I (a) prove that this is not my fault and I am not actually a spammer, and (b) stop the spammers from sending mail from my account!?

*John Doe*

**O** Relax. You haven't been hacked, and you're not going to be punished for someone else's crime.

What's actually happening is that some spammer or other is sending their spam in the usual way – botnet-infected home PCs are a common source these days. The spam messages have a "From:" field just like any other email, and this spammer happens to have decided to put your address in that field. They could pretend their spam comes from billg@microsoft.com or foo@bar.baz, but for ritualistic reasons having to do with what might have worked against certain spam-blockers long ago, they tend to prefer real but non-famous addresses. Or, at least, apparently-real addresses at non-famous domains. They're probably sending tons of messages "from" various names @johndoe.com.au.

When these messages are sent to a nonexistent address, as many of them are, a modern mail server should recognise that they're obvious spam and just drop them silently on the floor. An old-fashioned or incompetently set up mail server, however, will treat them as legitimate mail, and bounce an error back to the alleged "from" address. Those bounces, known as "backscatter", are what you're receiving.



WINS A THERMALTAKE CHALLENGER PRO KEYBOARD

Backscatter is only a nuisance, though. You didn't send the spam, and no system administrator, certainly not anyone at Google, would think you had. Anybody with the power to actually block legitimate mail from you or suspend your Google account is unlikely to be so technically clueless that they think you're really a spammer.

(The malicious variant of this is the "joe job", where someone sends spam messages with a fake "from" address with the intention of making that apparent sender look like a spammer. Actual professional spammers, in so far as these highly incompetent individuals can be described as professional at all, do not do this.)

Note that you may actually *really* be sending spam, if you own a computer that's been infected by botnet malware. That spam will have the same random from address as any other spam, though; only by enormous coincidence is it likely to have your real address on it.



### The Hard-Drive of Babel

**I** I've got a 1Tb USB 2 external drive, and I want to make it accessible to Windows, Linux and Mac.

How should I format it?

*Ern Simmons*

**O** There's no really good solution to this problem.

The best option for most purposes is probably the old FAT32 filesystem, because FAT32 is legible on all three platforms. FAT32 disks can't have any files larger than 4GB, though. Windows also doesn't want to let you format a disk bigger than 32 gigabytes as FAT32, but you can do it with a partition management utility, or a standalone utility like fat32format, [bit.ly/fat32-format](http://bit.ly/fat32-format).

NTFS is the modern standard Windows filesystem. You can read NTFS on all three platforms, but Macs can't write to NTFS disks without one or another not-perfectly-reliable hack.

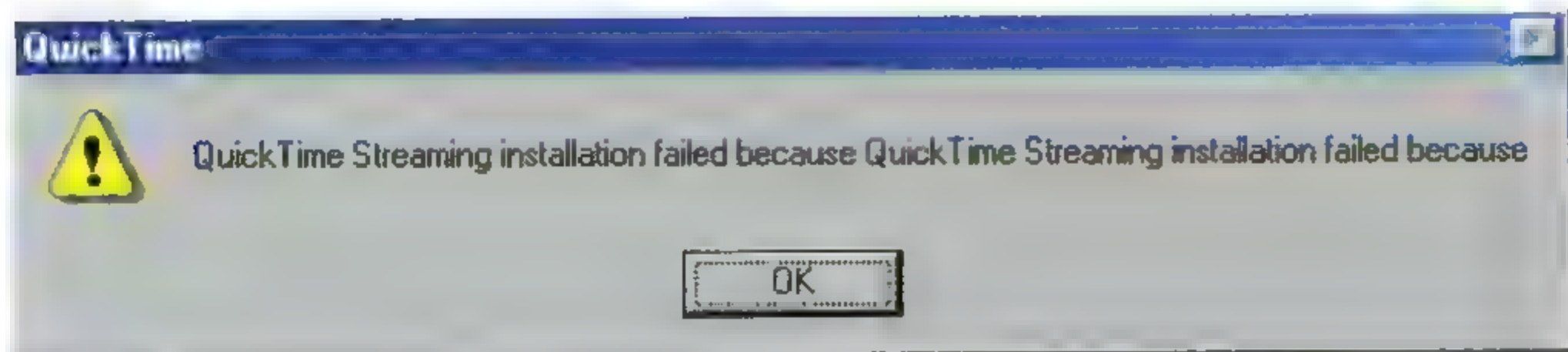
If you format the drive on the Mac as non-journaled HFS+ then you'll be able to use it natively on Mac (of course) and Linux, but not on Windows unless you install MacDrive (which costs \$US50) or some other Mac-filesystem software.

You could also cheat by converting the drive into a Network-Attached Storage (NAS) device, with either a cheap (\$40 or less on eBay) USB-to-NAT adapter of some sort, or by removing the physical drive from the USB enclosure and putting it in a NAS box.

### More computer anxiety

**I** Sometimes when I install Windows updates (Windows 7 Home Premium, 64 bit), it asks to restart to finish installing the updates, then reboots, chugs away for a while loading Windows and "configuring updates", then reboots AGAIN before finishing. I think it might even have rebooted one MORE time on





**Behold: An update that can't finish until it's already finished. (This was a real error, by the way.)**

one occasion, but I'm not sure.

Is this symptomatic of anything bad? I'm wondering whether it's going back to a restore point or if there's some crafty malware hiding itself under each new update. I'm finding it hard to believe that any update really needs to reboot the system more than once.

*H. Lamb*

**O** I can't rule out the multiple restarts happening because of some terrible disease, but an extra reboot definitely is something that Windows sometimes has to do to install a standard update.

I don't know how many actual individual updates, if any, require multiple reboots. I think it's usually that one update requires a reboot and has to be fully installed before another update, which also requires a reboot, can be installed. A fresh Windows install from an old unpatched disc can require several reboots during its lengthy initial update process. This may be something worth complaining about, but it's not anything abnormal.

## He may already have contaminated the rest of the world

**I** How do you move an invisible window?

I was reconfiguring my two-monitor computer (Windows 7) and... to be honest I don't know what I did, that was two martinis ago, but now my "main" monitor is monitor number two and my second monitor is black and when I try to bring the display properties thing up to fix it it's off the monitor somewhere.

(Yes, this is another one of those "I'm emailing you from my laptop, because..." letters.)

If I could only bring the damn display properties thing over onto the monitor I can see then I could probably unfuck myself and maybe even shit Sergeant Hartman some Tiffany cufflinks, but I'm reduced to just fishing over there blind with the mouse pointer and it's just not going to happen.

*Private Pyle*

**O** An oldie, but a goodie.

Open Screen Resolution, or whatever other properties window it is that you need. You can't see that window, but it's now open, and because you just opened it, it's the active window.

Press Alt, to go to the menus for the window, then press Space, to open the first, top-left-corner, menu, then press M, to select "Move" on that menu.

Now when you press an arrow key, you'll move that window, wherever it is, in the direction the arrow points. More usefully, after you've pressed any arrow key once, the window will be attached to your mouse cursor, and you can move it around by just waving the mouse without pressing any buttons. Not very much waving should be necessary to bring the window back to visibility.

This technique will work with any window, provided it's a "normal" window with a standard top-left menu (so it won't work with, for instance, Winamp).

Now drop and give me 50, maggot!

## "You're not getting into the network in THOSE shoes."

**I** I've got a Windows 7 PC, a Windows 7 laptop, an old Windows 2000 machine in the laundry as a better than nothing backup box

and an iPhone 3GS, all connected to my nameless 802.11b/g/n Wi-Fi access point. Seriously, this thing doesn't have a brand on it anywhere – the sticker just says "150Mbps Wireless Broadband Router". It was \$21 delivered on eBay, but I am now thinking it might not have been such a bargain.

When my friends come over, it's always a huge mess. They can't connect a laptop or a phone or anything else to the access point, or they CAN connect, but one of the other machines disappears. If I turn off the laundry computer, one visitor can connect. If the laptop and the laundry machine are off, two new machines can connect. And so on.

I've tried turning off all encryption (even WEP), setting the password to "password" to make sure they're typing it right, resetting the access point, nothing helps. What am I missing?

*Jac Raby*

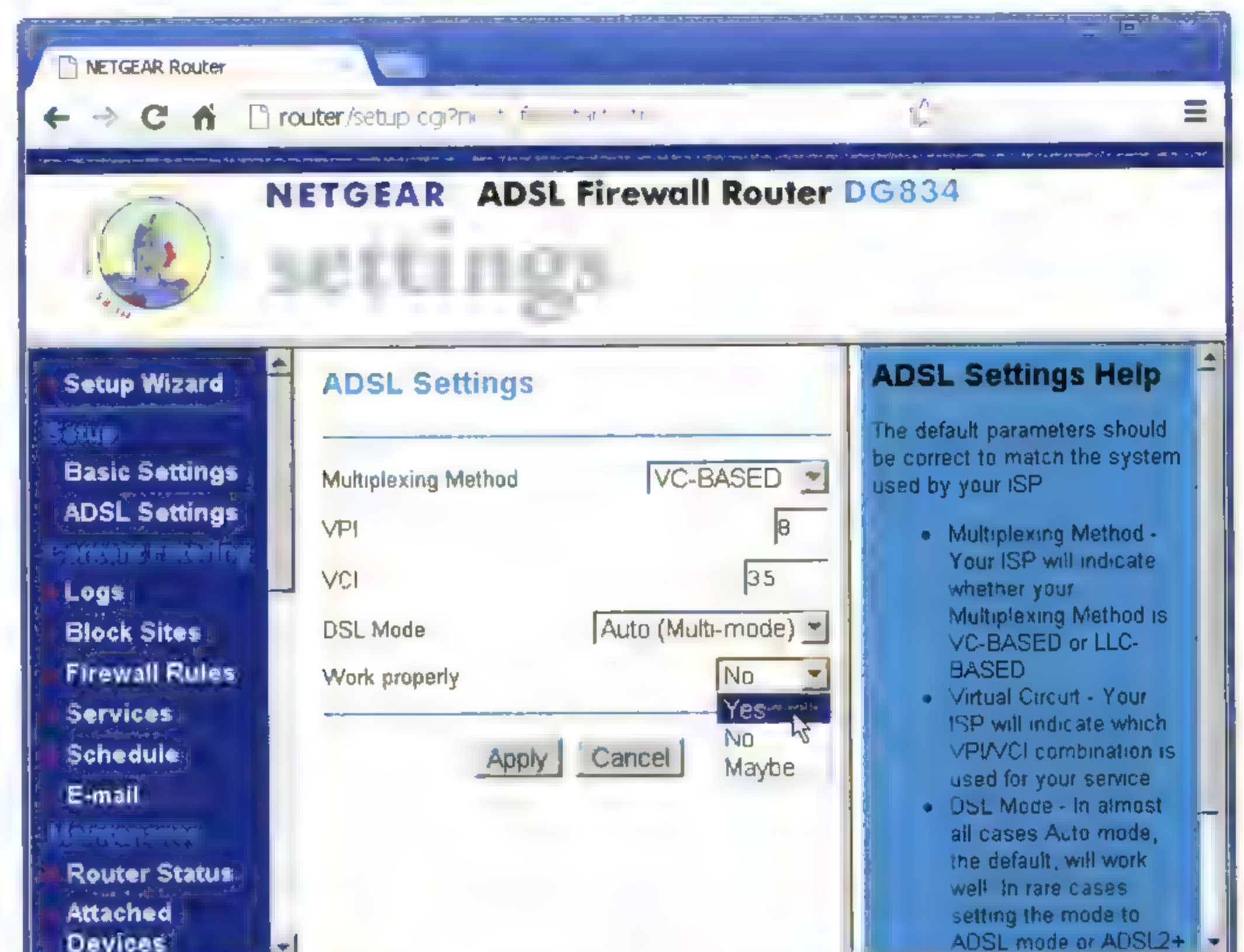
**O** Jac's Access Point Of Mystery has Ethernet jacks on the back, so I had her try disabling the Wi-Fi adapter on her laptop and hook up via cable. This worked, and now one more wireless client could connect. So now Jac got to grovel through the Chinglish setup interface for the access point, until she found the "Max Clients" setting, which was set to "4". Cranking it up to 50 solved the problem.

(The problem could also have been DHCP on the access point being told that it can only hand out four addresses.)

Not every access point or wireless router has this feature, because it's not actually very useful. It provides some sort of half-arsed security, but that's about it for most users. Setting a client limit can actually be a good idea if you're having to deal with more than twenty simultaneously active clients and seeing problems, because you're running out of radio bandwidth and access-point processing capacity. In that case, limiting clients to, say, 16, and then adding another access point using a different channel that the rest of the clients can connect to can be helpful. Even cheesy no-name access points should be fine with more than ten clients, though; it remains a mystery why this AP was limited to only four.

A more sophisticated version of the client-limit-for-security idea, which most routers and access points support, is to tell the access point to only allow particular MAC addresses to connect. Every network adapter has its own unique MAC address; it's possible to spoof the address of a wireless network adapter, but this is beyond the abilities of the average teenager next door who wants to download porn using your bandwidth.

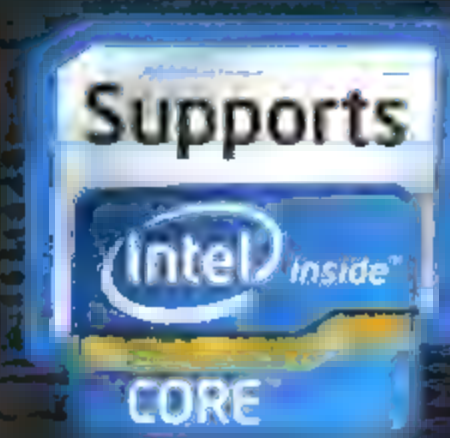
(The somewhat-elegant attack solution in that case is, of course, to wait until one of the authorised clients isn't connected to the network, then spoof your address to match that one, then see if you can log into the access point's admin interface using the default password for that device, and then add your own client to the allowed list.)



Well, there's your problem.



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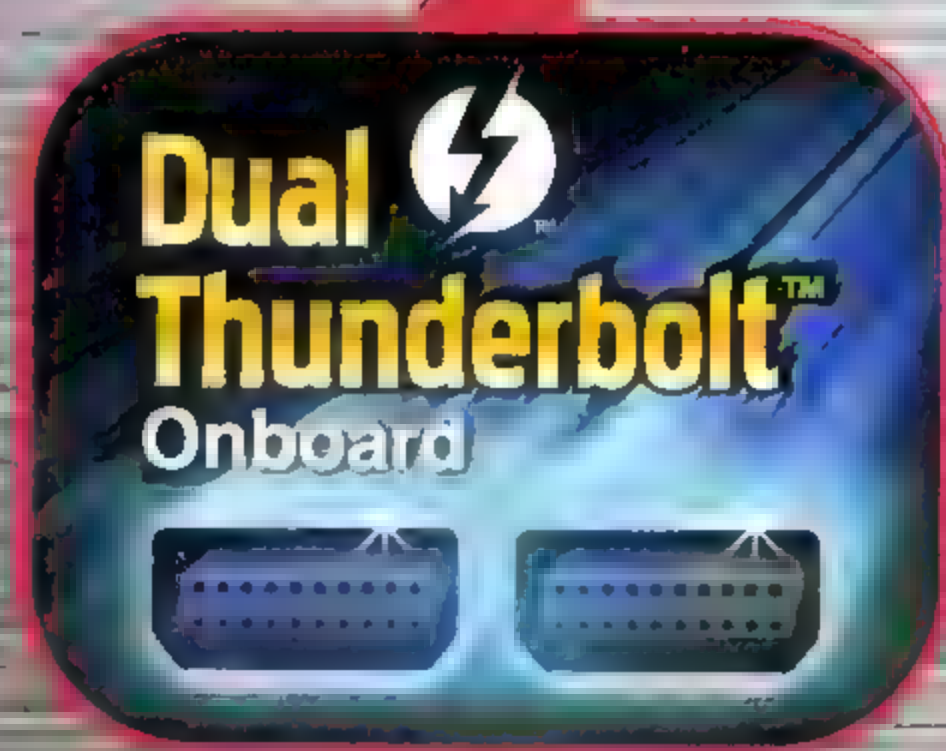
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# The Balance

Is there such a thing as too much choice?

One of the touted tenets of gameplay enjoyment is the all-important immersion factor (as far as one can sitting on the couch or Command Chair in the Man Cave can be immersed). For many game types the more immersive the experience, the more enjoyable it is. Graphics and sound, especially for FPS games, are key to enveloping the player and transporting them to another world where they can kick ass and decimate entire armies without taking a scratch – which, in itself, is part of the equation:

story, and thus the impetus pushing the player forward. Mostly, this revolves around what you can and can't kill. There's a moral decision for example when it comes to children: killing kids is bad form, and games tend to handle this one of two ways: the world is mysteriously devoid of children (perhaps everyone is vat-grown as an adult?), or children are present but are somehow immortal and no one seems to be aware of this amazing fact except you. Skyrim decided on the latter, for example, because it's more immersive

Dishonored handles it differently again: you can kill anyone, including essential characters. It's just that if they are essential to the story, right after you watch their lifeless body slump to the floor, you're told the conspiracy has dissolved and the game ends. So, ultimately, you can't kill them if you want to progress, but there's a subtle and important difference here: the choice is yours to make. In games like Skyrim or Borderlands, the choice is taken away from you entirely. And it helps Dishonored immensely. After all, you're a master assassin so not being able to kill someone would detract from your impact in the game world, and thus immersion.

Graphics and sound paint a canvas for your game, but it's subtle differences in gameplay like this that flesh out immersion in a game, and the balance that needs to be struck to maintain it. (P)

You can't reliably give complete freedom without interfering with the story, and thus the impetus pushing the player forward.

immersion would be spoiled if you really were as fragile as in real life, though there are games which do trade on being as realistic as possible, such as the ArmA series.

Immersion is also why we spend thousands of dollars upgrading our gear, because frames per second are as critical to the experience as the game itself. And then there's Eyefinity and Surround, where three to five monitors can envelop us even more.... So I think it's fair to say immersion is just a tad pivotal to the gaming experience.

But hardware aside, which is a fixed quantity, it's the gameplay of the game itself, ultimately, where most of the work goes. And within this, a key tenet is freedom.

Games like Skyrim, Just Cause, GTA, the Far Cry series and many others give you a sandbox where you can go anywhere and do pretty much anything. And it's awesome, because the more freedom you're given the more immersive the experience.

But freedom has a price. You can't reliably give complete freedom without interfering with the

to see villages with people of various ages than those without.

Essential characters are a problem too: there's nothing more immersion breaking than watching a dragon attack a town, only to have some people pull a Highlander on you and mysteriously not die (though the synergy of a MacLeod in Skyrim wouldn't be lost here!). But if these key characters could die, chances are it also ends your story and thus the game.

So there's no argument; you can't have a truly free-form world, but there's still a lot to be said for immersion in how these situations are handled. As with Skyrim, essential NPCs can't die, but they do take damage and fall to the floor, appearing close to death. Borderlands handles this a little differently – you simply shoot straight through them like they're made of air, and not just essential NPCs but everyone who isn't an enemy (eg, all the inhabitants of Sanctuary). This would be jarring in Skyrim, but for Borderlands it's ok – it's a frag and loot fest, and even the visual art style doesn't trade in immersion for realism.

Really, Ashton? You tried to kill the kids?  
[amills@atomicmpc.com.au](mailto:amills@atomicmpc.com.au)





# IN PROFILE: Chris Avellone

**Katie Williams** catches up with Obsidian's Chris Avellone during a visit to Melbourne, and quizzes him on Kickstarter, the Australian development scene, and what makes a game, a game.

**T**he enthusiasm and energy that I see in the developers here, the excitement – it's infectious, energising. It seems to be a really interesting time to be making games in Australia."

Chris Avellone looks to be in a constant state of relaxation, even when mingling in a room of several hundred game developers. Integral to the development of games such as Planescape: Torment and Star Wars: KOTOR 2, he's probably best known for his work on Fallout: New Vegas, and it's his 15 years of game design expertise that he'll be drawing on today.

He's here in Melbourne, alongside other well-known developers such as Robin Hunicke, to deliver a "game design masterclass" at Game Connect Asia Pacific (or GCAP, as it's more colloquially known) – and I've managed to tug him away from his catered lunch to answer a few questions on game design, New Vegas, and that crowdfunding phenomenon that has us all throwing our billfolds at projects aiming to revive old-school game design ideals, just like Avellone's new Project Eternity.







## In Perspective

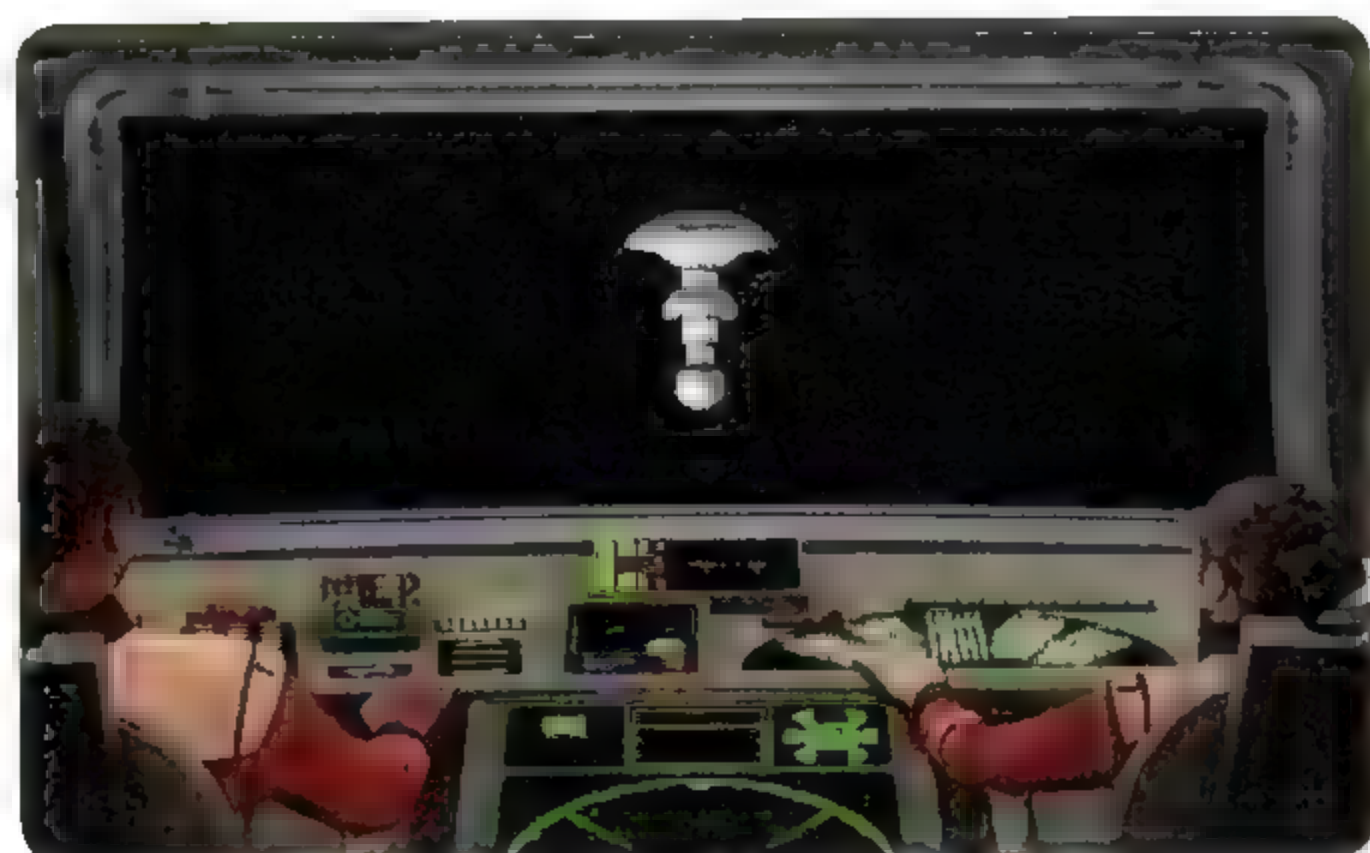
Avellone's masterclass charts the development of a large game, from conceptualisation and pre-production all the way through to managing a team and weaving their talents into a stunning end product. Such advice is particularly interesting to hear in the Australian games development landscape, which has undergone some huge changes in recent years and is still evolving every day.

"The people I talk to here, they have great ideas and they obviously love game development," Avellone begins. "But it's a bit sad that being able to get a formal job at a big company out here seems difficult to nonexistent. It seems like a lot of the big companies have shut down, and while there's a lot of talented people, there's not exactly a lot of opportunities left for employment."

It was Krome ceasing its operations in late 2010 that signalled the collapse of large-scale development studios in Australia, with globally known names like LA Noire developers Team Bondi later treading the same dismal path. The losses of such studios, however, have opened new opportunities in other areas of development;







Star Trek: Starfleet Academy

developers of casual titles like Halfbrick and Firemonkey's are some of the biggest in the international industry, and many of Australia's newest indie development studios were formed from the broken bones of now-defunct larger studios.

Avellone works at California-based RPG development powerhouse Obsidian, and I note that his presence here in Australia is unusual – especially given that our developers take a very different approach, tending to work primarily on mobile-based games in much smaller teams.

"That must be so nice," he says with a laugh. It's been awhile since he was in a manageably-sized team. Large-scale development has left him frazzled in the past, worn thin trying to manage so many incredibly specific areas of gameplay and the teams managing them. "If you're the guy rigging the character model, that often ends up being your entire job for six months. But if you're an artist in a smaller team, you might have a bit more flexibility, more



"It seems that there are a lot of opportunities for developers almost anywhere to be able to form a team, get crowdsourced funding, and then see about building something," he says. "But it seems that the Kickstarter efforts here aren't as great..."

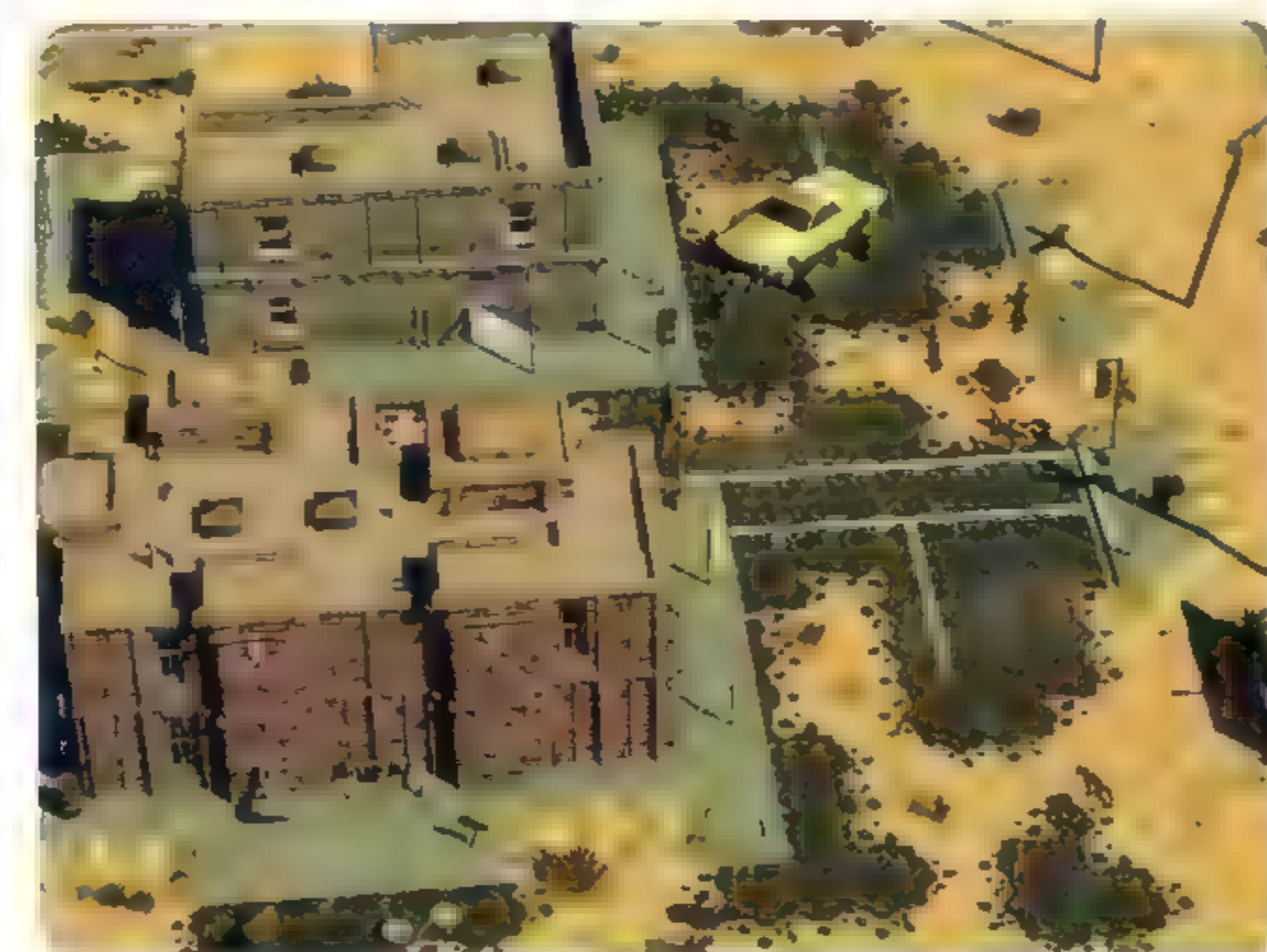
And it's partially true. While Australians are able to pledge money towards projects on almost any crowdfunding site you can think of, we're barred from listing projects on Kickstarter, the most prominent crowdfunding site of all. While we have alternatives like Pozible and IndieGoGo, their presence is not as great; Avellone knew of the latter only because of a fan film project, *Fallout: Lanius*, that he had backed through it.

It is pretty exciting to see someone "grab the *Fallout* torch" and do their own take on the *Fallout* universe, says Avellone. "Still, I feel that

we're not really exposed to many crowdfunded Australian games, and that's unfortunate."

## Telling Stories

So going back to GCAP, then. His game design masterclass follows a keynote speech by Robin Hunicke, who's most well known for her work on the whimsical PS3 adventure game *Journey*. Based around the idea of wordless player interaction, it just might be the antithesis of a text-heavy game like *New Vegas*, and it's unique to have such different designers headlining the same conference.



... while there's a lot of talented people, there's not exactly a lot of opportunities for employment.

freedom. You might be able to, say, include your own weapon that you've personally designed, just because the team size is so small and everyone can pitch in on a whole bunch of different fronts."

Still, in spite of the apparent room to spare for creativity, we're not seeing that many truly resonating games come out of Australia. The majority of the games being developed are currently the sort of thing you might play while waiting for your bus at the stop. The website *TwntyTwlv.com* – which describes 2012 as "a banner year for indie games" – has only one Australian game on its long list, the recently released *Zafehouse: Diaries* (made by ex-Atomic Editor, Logan Booker). Why is that? In a country with so many indie studios acting as potential seedbeds for innovative growth, why are we seeing so few notable games?

Avellone, whose *Project Eternity* is Kickstarter's highest funded video game campaign to date, suggests that it may be because crowdfunding, the new game development funding model of choice, is not as accessible to Australians.



Fallout 2





"I far prefer how Journey handled the storytelling," Avellone confesses. "I think that games don't need a lot of words, or face-to-face interaction, to communicate a story at all, which is kind of strange for a dialogue writer to say," he adds with a laugh. "But like, if someone's standing on a ridge in Journey, and they're almost in a panic pounding their sound-bubble button – you know what that person wants. They want you to follow them. If there's some sort of much more visual or iconic representation of how characters can interact, that can tell an equally great story without a crapload of words."

Where New Vegas differs, of course, is that its players' companions aren't real people online; you'll never see the hard-drinking, dirtymouthed Cass leaping for joy and singing sweetly to you in the harshness of the desert. This is where masses of dialogue comes in handy, says Avellone; it's funnelled into creating a highly believable backstory for the entire New Vegas world.

"Some of the most fun sequences to write in New Vegas were for the companion characters," he explains. "You can actually have a conversation with a companion about the



Icewind Dale



This is where masses of dialogue comes in handy, says Avellone; it's funnelled into creating a highly believable backstory.

different factions, and eventually even reverse their stances on certain organisations. That's something that can only happen with your encouragement or input."

"Companions are also a great means for acting like sounding boards for the player, sort of questioning the player and his actions. Like, 'Why did you do that?' or 'What do you think of this?' And having a conversation like that, you couldn't do it solely through visuals or iconography."

But just like the ways in which his approach differs to Hunicke's, Avellone knows and accepts that his own opinions can be questioned by other designers. During his masterclass, he

declares that a great story with shitty mechanics still makes for a shitty game. It's a statement he probably didn't realise was so loaded until he got home and checked the resulting furore on Twitter that night.

He laughs when I quiz him about it. "No, I don't think that something like Dear Esther is a game. It's a great experience, it's a great interactive story – but it's only interactive to a certain extent, and not enough for it to really be a game."

But how far would Dear Esther need to go to be legitimised as a "game?" Are the last two Fallout games really much more than intensely detailed stories, wrapped in the shiny veneer of



Neverwinter Nights 2



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Star Wars: Knights of the Old Republic II:

the cinematic VATS system?

Avellone, while insistent that he wouldn't class it a game, concedes that Dear Esther really needs an interactive medium for the story to work. He describes one of his favourite flashback scenes in Dear Esther: walking beneath water, amongst the rusting remains of burnt cars. "An experience like that can work so well in that moment, so powerfully – I don't think



a novel could've pulled that off, I don't think any other medium could've pulled that off."

As someone who plays a huge role in writing and shaping the worlds within his video games, Avellone's goal is to braid the story into an immensely enjoyable gameplay experience, leveraging the interactivity of the medium to not just have players experience a story, but for them to be able to create their own in a lush world.

"Powerful as Dear Esther was, something like that ultimately does have to become a game at some point, to be entertaining and fun for the player."

## Shut Up and Take My Money

Well, okay then. I ask him: what stories is he currently building? What new experience is he currently crafting for us?

It's not, sadly, a new Fallout game. Given New Vegas' "roller-coaster development", I can understand why he's left the exhausting world of radiation-riddled deserts for awhile – and moved onto the crazy likes of the new South Park RPG, the Stick of Truth. He's unable to talk about that due to publisher leashing, but he's happy to talk about his other two current projects, Wasteland 2 and the codenamed Project Eternity. Interestingly, both were the result of hugely promoted and well-funded Kickstarter campaigns, hence a reason why Avellone advocates the use of crowdfunding to support game development so strongly.

Project Eternity is currently in pre-production. "We're figuring out the scope of the world, what factions are present in it, what overall theme we're trying to drive home, how companions might fit in with all of that... and now that we know how much funding the title has, we can finally make those production calls in terms of how many resources we can allocate for design, or how many level designers or programmers we need."

This is immensely different to the traditional publishing model; Avellone and his team are now working to an exact budget, and instead of aiming for a publisher's requirements, they now aim for that of the gamers who backed the project. It's a fantastic way that we, as gamers, can contribute to the development of games that we truly want to play – but being a relatively new way of getting a game published, we just don't know what long-term effect it'll have on the industry yet. Will crowdfunding break the current cycle of triple-A military shooters for more experimental, indie titles? What will happen if a Kickstarted project goes under?

Kickstarter began in 2009, but we're only just beginning to see the games coming out of it. The campaign for roguelike spaceship simulator



Alpha Protocol





Fallout: New Vegas

FTL: Faster Than Light, for example, was a resounding success, and the game's one of the highest-rated indie titles this year.

But we're also beginning to see the first failures. The fully funded turn-based horror game Haunts: The Manse Macabre recently folded, citing the departure of its programmers for its inability to deliver a final product to backers. The team behind the campaign is still trying to figure out how to salvage the project, or get refunds out to people.

"You know, I've always wondered what will happen when the first big Kickstarter title goes under, or fails to deliver," Avellone ponders. Not every game can receive the gamers' seal of approval, after all, and there's no absolute guarantee of quality even if it's the spiritual

successor to a classic DOS game, developed for a very narrow niche, or headed up by big name developers. "If a prominent, funded campaign fails to deliver, that's going to make people more wary about the process."

But Avellone also wants to know: what will happen when the first huge, successfully crowdfunded game sells a million units?

"Will that make publishers pay attention? They might say, 'Wow, you know what? If that sells a million units, maybe we shouldn't have discounted the genre so quickly. Maybe we should do adventure games again. Maybe the PC-only game is still a viable platform.'"

It's definitely a hard argument to make with publishers right now – and even with fans throwing over three million dollars at Double Fine



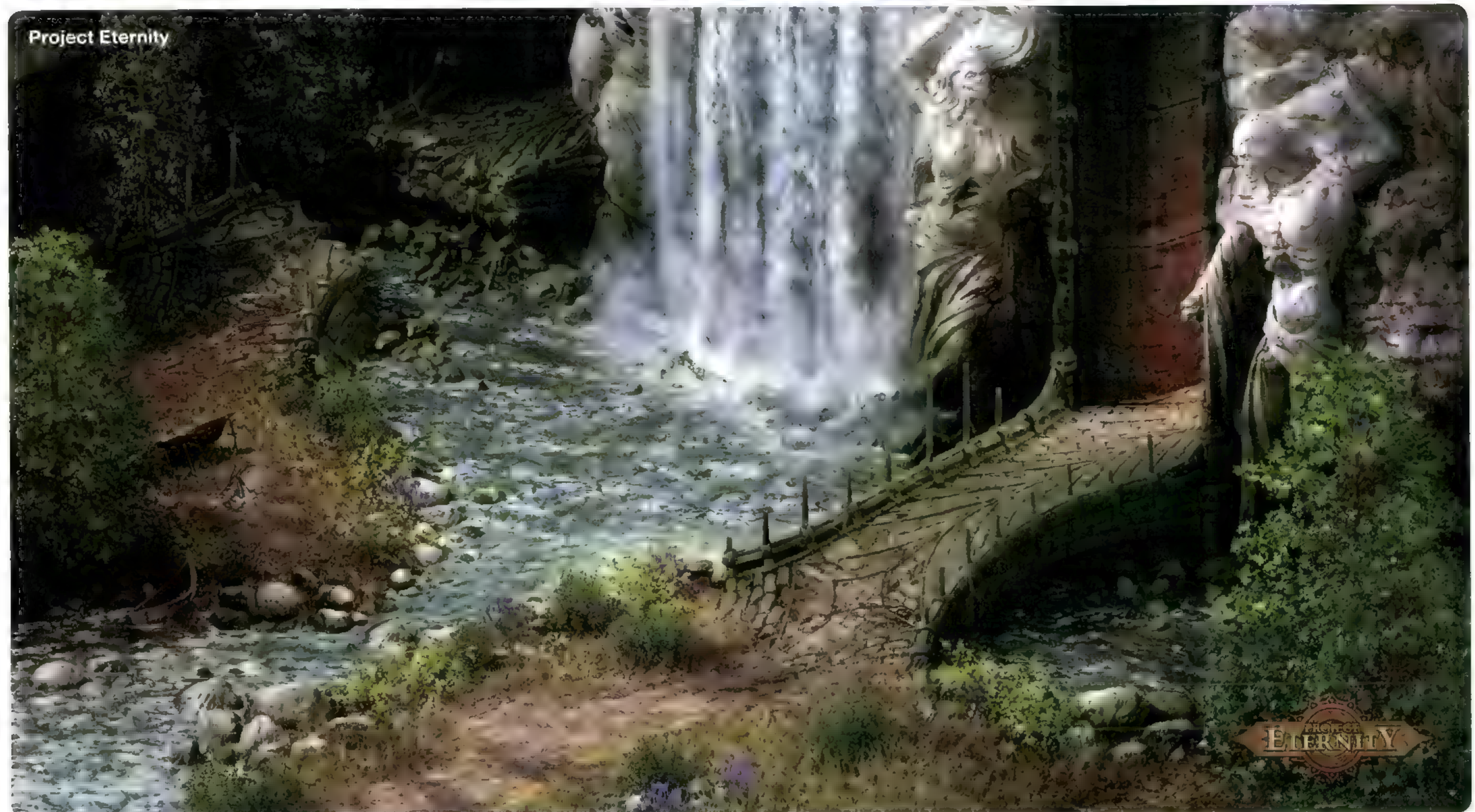
Wasteland 2

to make an old-school adventure game, we're still not seeing publishers announcing new titles in obscure niches.

Project Eternity, an intentional homage to the old-school, party-based RPGs that Avellone worked on back in the day, achieved nearly four times its funding goal, and Avellone hopes that it will be successful enough to contribute to a lasting change in both the industry's design and publishing standards.

"I really hope Eternity does make a splash – by being really, really successful when it releases," he finishes, his voice full of a sudden determination.

"And you know, I think we can do it."







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# HARDWARE

NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE

Unsurprisingly this issue has been a somewhat bittersweet one, especially when we look back at Atomic's proud history in the hardware space.

What you may not realise is that Atomic has not only been delivering the lowdown on the latest hardware for over a decade, but it has also been a crucial part in making the industry pay

attention to Australia. When we started, brands like nVidia and ATI had little knowledge of our corner of the world. Thanks to the lineup of hardware writers that have graced these pages, we made the industry take notice.

It has been a pleasure riding the cutting edge with you, Atomicans, and we hope you join us on the next part of the great Atomic journey.

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## HARDWARE CONTENTS

### MOTHERBOARDS

Gigabyte GA-F2A85X-UP4 36

### VIDEO CARDS

Powercolor Devil 13 7990 38

ASUS HD 7970 Matrix 39

### SSD

Plextor M5 Pro 42

### CASE

Cascom KK-9949 Hacker 35

Cooler Master CM Storm Scout 2 43

### PERIPHERALS

Razer Deathstalker 40

### Creative Soundblaster

Tactic 3D Rage 42

### CPU

AMD A10-5800K 34

### LAPTOP

Razer Blade 44

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# AMD A10 5800K

AMD offers a very viable option for lower end builders.

Street Price \$135 Supplier AMD

Websites [www.amd.com](http://www.amd.com)

Specifications <Socket FM2>; A85X chipset; ATX form factor; 3 x PCI-e 16x (1 x 16x, 1 x 8x, 1 x 4x); 3 x PCI-e 1x, 1 x PCI; 7 x SATA3; DDR3-1866

Trinity launched a few months back on the mobile market, and has quietly made its way to the desktop platform in October, though we didn't start seeing significant stock in Australia until early November. So why has AMD kept this launch fairly quiet compared to previous APU launches, like that of Llano? We're not completely certain, but it likely has something to do with AMD still producing most of the Trinity line-up with a 65W TDP, and even 100W TDP on certain SKUs. Meanwhile, the competition, found in the form of the Intel i3 family, is enjoying superior single threaded performance, with a lower power draw and thermal output of 55W.

AMD is doing well with the APU in terms of graphics performance, although the Intel i3s HD2500 GPU has also made significant ground over previous generations. It seems the HD7660D GPU found in the A10 5800K is superior to Intel's offering when gaming at resolutions above 1280x720, though due to lower resolutions having a higher CPU dependency, Intel comes out ahead, despite the slower GPU.

In our testing at 1024x768, both the i3 3240 and A10 5800K were extremely comparable, scoring within 5% of each other the vast majority of the time. However when playing games at 1920x1080, the HD7660D on the A10 really begins to shine through, producing some playable frame rates on less demanding titles such as Dirt 3.

When comparing single-threaded CPU strength, there's no denying Trinity is behind Ivy Bridge. Not only can the i3 3220 come out ahead in tests such as Cinebench and (unsurprisingly) PiFast; Intel is doing so with its lowest model i3. We don't have any samples on hand to

confirm, but according to websites like Anandtech, even the Pentium G850 is coming out ahead of the A10 5800K in single threaded Cinebench performance. Multi-threaded tests go a little better for the A10-5800K, managing to match the performance of the i3 3220 in most CPU-bound scenarios and even come out as a strong leader in others.

If you're considering an upgrade over Llano, or have been holding out to see what Trinity can offer over the older APU, you can expect roughly 10% performance gains across the board. The up side of this is that it's essentially free performance, as prices have actually dropped when compared to the equivalent Llano chips, and by a noticeable margin. If you're building a PC on a very small budget, you should be able to put together something for a few hundred dollars.

For people really chasing a bargain, it seems the Athlon X4 750K will be ideal. For \$90 you're getting an A10 5700K with the GPU disabled, meaning if you've already got a dedicated GPU, there are savings to be made when comparing the new Athlon to other Intel and AMD offerings, and at \$90 the CPU is actually an attractive pickup.

Overclocking, as you'd expect, hasn't been a major focus for Trinity, though that isn't to say it can't perform well with a little tweaking. AMD no doubt noticed the hole in the marketplace for low budget CPUs with an unlocked multiplier, as Intel doesn't begin unlocking its CPUs until the i5 3570K – a \$235 CPU. AMD, on the other hand, are offering five unlocked models, starting with the \$90 Athlon X4 750K mentioned earlier, and topping out at the \$135 A10-5800K. For this reason an overclocker can gain addition 'free' performance from their Trinity purchase.

Unfortunately it seems the aggressive 4.2GHz Turbo is approaching the limits of this chip, as

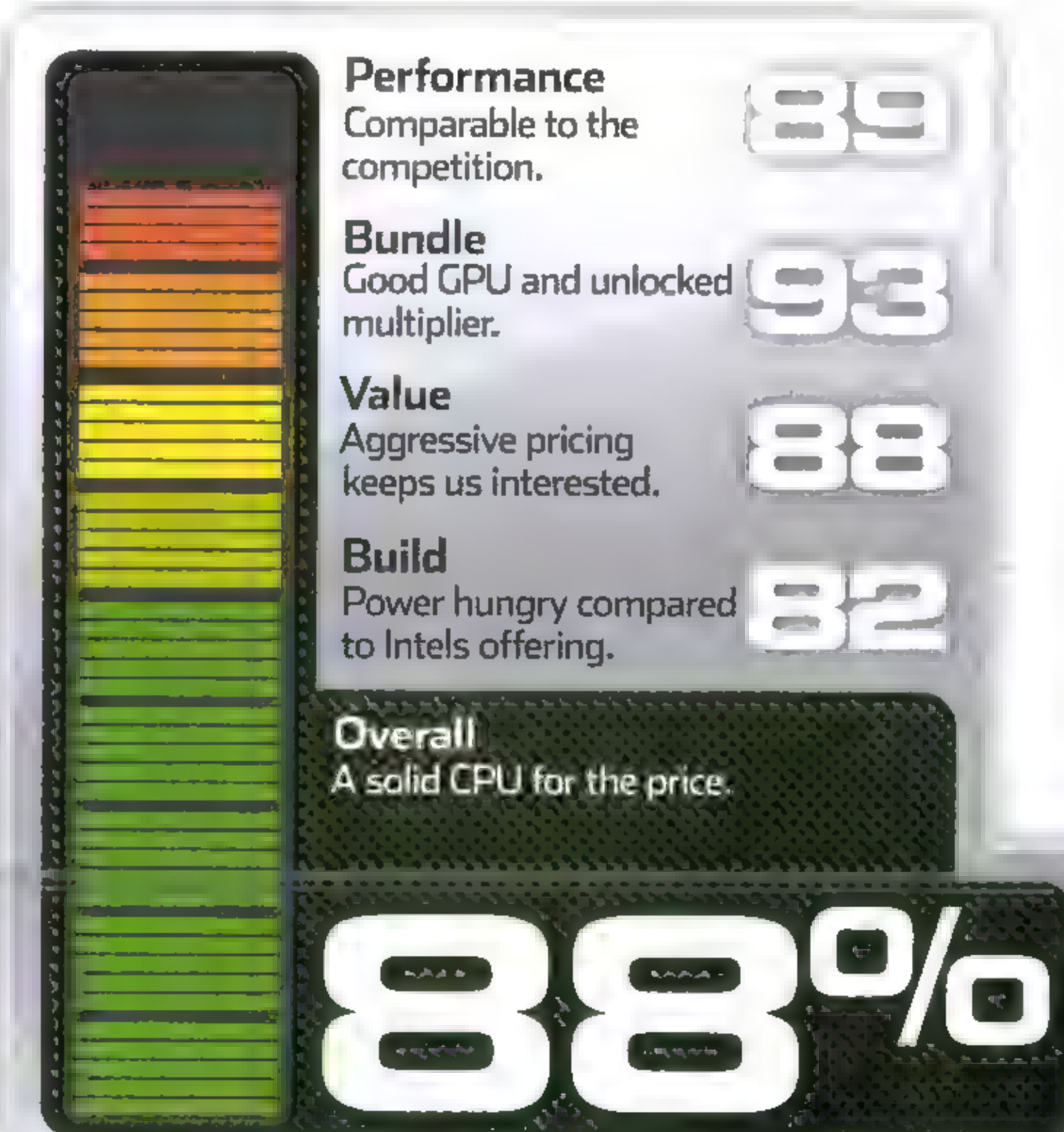


we were only able to achieve a maximum core clock of 4.5GHz. Still, this extra 300MHz comes in handy and translates into a roughly 5% performance increase across the board. Of course, we are still using an early CPU sample, release BIOS on our Gigabyte motherboard and also going in with a limited understanding of this chip, so future improvements may be made on this front. But given the design and focus of Trinity we won't be holding our breath.

Overall I don't think anyone could say either the i3 3220 or the A10 5800K is a clear winner. Intel has strengths, the primary ones being single threaded performance (less relevant these days), and power draw (more relevant these days). AMD on the other hand has comparable multi-threaded performance, unlocked CPU multipliers and a faster integrated GPU. Depending on which features you prefer, should determine which road you choose to follow. **MW**

## AMD A10 5800K

<A10 5800K>	Stock 38 x 100; DDR3-1600 @ 9-9-9-24 1T	OC 1 (10% over stock at stock volts) 42 x 100; DDR3-1600 @ 9-9-9-24 1T	OC 2 (best stable manual overclock) 45 x 100; DDR3-1866 @ 10-10-10-26 1T
PiFast (seconds)	43.20	41.67	40.92
wPrime 32M – Single-thread (seconds)	89.8	86.4	84.2
wPrime 32M – Multi-thread (seconds)	16.8	16.1	15.4
CineBench R11.5 x64 – Single-thread	1.08	1.13	1.19
CineBench R11.5 x64 – Multi-thread	3.34	3.39	3.45
AIDA Read (MB/s)	19386	22876	23127
AIDA Write (MB/s)	22458	22876	24432
AIDA Latency (nanoseconds)	26.2	26.3	26.1





# Casecom KK-9949 Hacker

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Street Price \$80 Supplier Casecom

Website [www.casecom.com.tw](http://www.casecom.com.tw)

Specifications ATX mid tower; 4 x 5.25in, 6 x 3.5in; 7 expansion slots; USB 3; SATA dock; 190 x 438 x 434mm (WDH)

**N**o matter how much innovation goes on, there are certain constants in the PC arena. This is especially true of cases, where we are constantly stunned at how some manufacturers can deliver well rounded, high quality products at cheap price points, but others seem incapable.

The Casecom KK-9949 Hacker is a wonderful example of this. With a pricetag around \$80 it competes against some seriously nice products from Corsair and Bitfenix. There are also models from companies like Antec, that are light years ahead of the rudimentary mistakes made with the Casecom offering.

On the surface, the Hacker looks alright, with a nice mix of blue metal highlights against the powder coated black case. This blue metal carries over to the motherboard tray as well, which on first glance looks well designed, with an obligatory hole for accessing CPU coolers from the rear and punched out cable management areas.

However once you look a bit closer the poor design becomes apparent. There is virtually no gap behind the motherboard tray to actually route cables, with it barely being enough to get a 24-pin ATX power line, let alone the spiderweb that develops when you route everything behind the tray.

There is also widespread use of one of our least favourite things, the plastic on metal

thumbscrew. These have been used for the side panels, as well as the optical drive mounts, and on our sample at least were screwed so tight we couldn't actually use our thumbs to remove them. The hard drive mounts are also made of cheap feeling plastic, and the window on the side panel is crafted by sticking tabs of metal through slots in the plastic. It came off almost instantly when David started playing with it, and while we like the fact that there are also grilled areas for side fans it is a shame that the case only ships with two fans.

It wasn't entirely bad however. The case does feature a SSD dock on the top, and has an internal USB 3 header. These are nice to see on a budget case, and while the SSD dock may seem to be a feature you'd never use, you would be surprised how often they come in handy.

Once upon a time these sort of things would have been acceptable in an \$80 case, but we just can't make excuses for them anymore. There are quite simply alternatives at a similar price that don't suffer from the same low quality design. It just becomes very, very hard to recommend the KK-9949 in the light of that. **DH**



**Build**  
Plastic thumbscrews and thin metal.

40

**Value**  
Doesn't match up to its competition.

50

**Cooling**  
Only two fans, but mounts for adding more

60

**Features**  
SSD dock and internal USB header are nice

60

**Overall**  
Out of its league in pretty much every way

55%



# GIGABYTE GA-F2A85X-UP4

This board is a fantastic budget all-rounder.

**Street Price** \$155 **Supplier** GIGABYTE

**Websites** [www.gigabyte.com.au](http://www.gigabyte.com.au)

**Specifications** <FM2>; A85X chipset; ATX form factor; 3 x PCI-e 16x (1 x 16x, 1 x 8x, 1 x 4x); 3 x PCI-e 1x, 1 x PCI; 7 x SATA3, 1 x e-SATA; DDR3-1866

**W**ith the launch of AMD Trinity on the desktop platform, it's only fitting that a new chipset be launched alongside to squeeze out every last drop of extra performance made available – and the A85X is just that chipset. For the hopeful Atomicans hoping to plug their existing FM1 socket CPU into this motherboard's shiny new FM2 socket, you'll be sorely disappointed as they're not compatible (a rare occurrence for AMD in the last few years).

The major changes involved with the new A85X chipset, when used in conjunction with Trinity, is the added PCI bandwidth. A85X chipset board like this UP4 from GIGABYTE now have native access to CrossFire, up to eight SATA 6GB/s

connections, four USB 3.0 connections and ten USB 2.0 connections, meaning for multimedia purposes, this chipset offers more than anything from Intel.

This board itself isn't quite so decked out, as it would be hard to fit so much on to one motherboard and still include display outputs native to the rear I/O panel. What is included, however, is more than enough to set up a media PC, file server or even a low-cost gaming machine using either GPU pairing or full-fledged AMD CrossFire.

Being a UP series motherboard the UP4 is even better suited to compact builds, as it has reduced heat output from the PWM, along with greater stability through reduced voltage ripple. This should come in handy with the new Trinity series of APUs, given the five available SKUs shipping with unlocked multipliers. Even if you don't overclock, the lower load temperatures on the motherboard means smaller heatsinks

are needed, resulting in a lower case ambient temperature; a rare situation in that there is no down side.

On top of the already impressive features included via the A85X chipset, GIGABYTE has included MVP support, allowing for boosted gaming performance should you wish to pair your Trinity APU with a more powerful GPU than is usually possible via AMD "dual-graphics" link – no doubt a very popular bonus for people shopping within this price range.

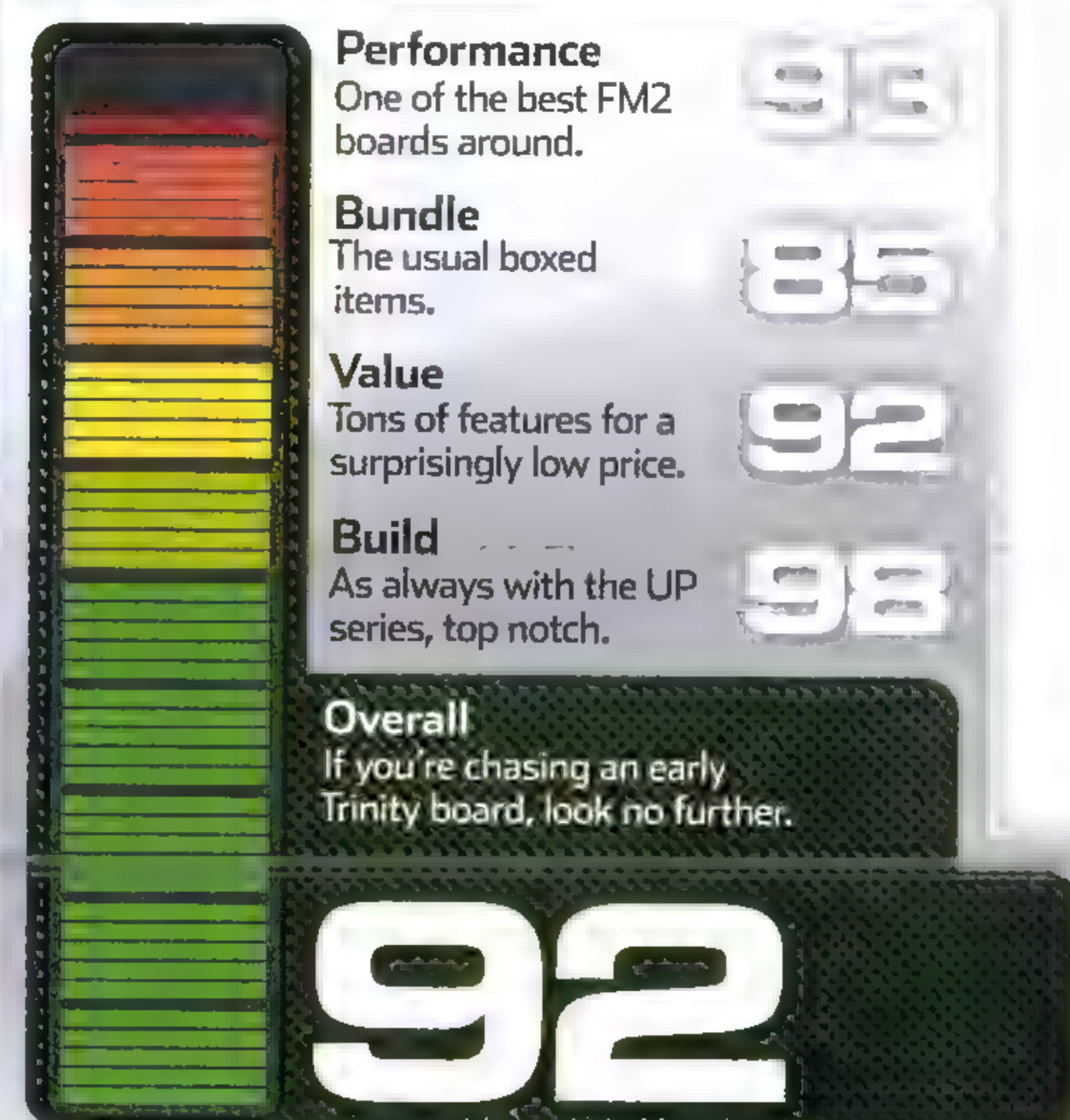
Another cool feature made possible through Trinity and the A85X chipset is the ability to run Eyefinity with nothing more than the three display outputs found on this motherboard – DVI, HDMI and Display Port. Of course you won't be playing games fluidly across all three screens, though for use as extended displays, individual screens and general computing, it truly is a remarkable extra. Of course, given the GPU is no longer part of the motherboard, and is now instead contained within the Trinity APU, graphics performance will vary. In our testing we found the performance of the HD7660D to compare roughly to that of the HD6670 desktop graphics card, which should be more than enough to drive three displays at 1080P for basic video use and simultaneous web applications.

Despite this motherboard being one of the more expensive FM2 socket boards on the market, it does offer a whole lot; and at \$155 it's hardly that expensive. Some may argue the value of Trinity is in its low cost, though if you've got a specific use for the extra SATA, PCI Express and display capabilities of this motherboard it's a solid pickup. Ranging from a budget gaming rig to dedicated media server, this board has all bases covered. **MW**



GIGABYTE GA-F2A85X-UP4

<A10 5800K>	Stock 38 x 100; DDR3-1600 @ 9-9-9-24 1T	OC 1 (10% over stock at stock volts) 42 x 100; DDR3-1600 @ 9-9-9-24 1T	OC 2 (best stable manual overclock) 45 x 100; DDR3-1866 @ 10-10-10-26 1T
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AIDA Latency (nanoseconds)	26.2	26.3	26.1







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Street Price \$1399 Suplier powercolor

Websites [www.powercolor.com](http://www.powercolor.com)

Specifications 925MHz core; 1375MHz memory (5500MHz effective); 'Tahiti' core; 2048 Shader Units; 6GB GDDR5; 2x384-bit bus width; Triple-slot active cooling; Triple 6+2-pin PCIe connectors.

We know what you're asking yourself right now, "Did I miss the HD7990 launch somehow?" The answer to that would be no, as AMD has not launched a reference design for the HD7990, nor in fact even announced the existence of a HD7990 model card. It appears Powercolor has taken it on itself to dub this new card a HD7990, and indeed has come up with its own PCB layout and design.

If anyone can't guess from the naming scheme of the previous AMD generation; the HD7990 is a dual-GPU card featuring two HD7970 (Tahiti) cores, each with 2048 shader units and a core clock of 925MHz each. This number can be raised to a round 1GHz core clock by pushing a rather large red button on the rear of the card, which applies an automatic overclock to the system. Think of it as a 'turbo' button.

Given the HD7970 already comes with a whopping 3GB of DDR5, it's no surprise that the Devil 13 sports an astonishing 6GB of DDR5 memory, three times that of even the GTX 680. Of course, memory capacity alone means very little once you exceed 2GB, unless of course you're playing games across three displays in very high resolutions – and of course this is what the Devil 13 is designed to do.

With 6GB of memory at your disposal, any game can be run with the highest possible resolutions and textures, and if you're willing to overclock the memory by a small margin, even high levels of AA and AF can be applied while running monstrous Eyefinity resolutions.

It's not the least bit surprising that this card chewed through our standard testing methods, even at 2560x1600 resolutions. Given the fact crossfire scaling has improved with the Catalyst



12.11 drivers, overall has seen 10% in popular titles and performance gains as large as 10% in popular titles like BF3, the Devil 13 is certainly faster (overall) than the reference GTX 690 we reviewed months back in issue #138.

As is usual with a dual-GPU video card, there is an enormous amount of heat to dissipate. Assigned to the task is a purpose-built triple slot cooler from Powercolor, sporting three fans, two of which measure in at 95mm, while the centre fan is just 80mm. When working together they manage to keep the card fairly cool, averaging load temperatures of around 78C over both cores. When overclocked with the turbo button, temperatures don't climb far, sitting around 80C.

Given these temperatures we likely don't need to explain why overclocking this card further becomes difficult. Pushing beyond 1080MHz quickly sees us applying higher core voltage, causing the card to hit 88C average across both cores. This card will likely break 90C sitting inside the average PC case, and certainly higher once you throw in a little bit of dust build up and a hot summer's day.

There is hope however, as spinning the fans up beyond the 20% default cools the card down to a significantly smaller reading. At the same 1080MHz core clock, we managed to stay under 82C while using a 50% fan profile. But to be honest, you really wouldn't want to run the fans any faster than this as they will be clearly audible, even inside an insulated PC case. We can't take points away for this though, as dual-GPU cards have always ran hot. Considering the GTX 680 is the coolest running flagship card Nvidia has ever produced, and the GTX 690 is still rather hot, it shows that there is only so much heat a single aluminium heat sink can actively dissipate.

Overall the Devil 13 fits its purpose. It's meant to be a monster of a card. It's meant to make you scoff "that is over the top". The Devil 13 is exactly the kind of card we love to see at Atomic as it's simply the most powerful card you can fit into a single PCI port. If you're after a card that will cause jealous forum users to remark "Why did you spend your money on that card?" while reading your system signature, the Devil 13 will surely do that.

It also allows you sit and smirk, as you really know they're just jealous they couldn't afford one.

MW

## Powercolor HD 7990 Devil 13 Synthetic Benchmarks

Unigine Heaven, Avg - 47

3DMark 11 - 13786

Score

## Powercolor HD 7990 Devil 13 Gaming Benchmarks

Avg - 24

Max - 108

**Performance**  
The fastest video card in the world.

100

**Bundle**  
Comes with a bunch of stuff, and the box is

92

**Value**  
Could buy three HD7970s instead.

73

**Build**  
We're surprised this card exists.

39

**Overall**  
It's a beautiful card, but you're paying top dollar

88%



# ASUS HD7970 Matrix

There is no spoon. But there is this card.

Street Price \$329 Supplier ASUS

Websites [www.asus.com](http://www.asus.com)

Specifications 1100MHz core; 1650MHz memory (6600MHz effective); 'Tahiti' core; 2048 Stream Processors; 3GB GDDR5; 384-bit bus width; triple-slot active cooling; dual 6+2-pin PCIe connectors



The HD7970 has been out for quite some time now, so we're slightly surprised to see ASUS launch a new addition to their high-end AMD line up. The Matrix isn't a new concept; ASUS has been making this card since 2008 with the HD4000 series from AMD.

This newest iteration in the Matrix branding is arguably the most extravagant yet, sporting not only the usual behemoth cooler, but also a bunch of additional extras for overclocking using the graphics card PCB, in much the same way some motherboards now have the capability.

There are four buttons found on the PCB in total, two which control the GPU voltage (+ and -), a single button to apply 100% fan speed, and finally a "safe mode" button which should reset CMOS and return the card to a "default" state. In the case of the Matrix, that default state is a healthy 1100MHz core clock, and 1650MHz on the memory, both upped considerably over the reference core clock of 925MHz, and even the newer "GHz Edition" cards from AMD.

In addition to the cool buttons, ASUS has also included a nice solid heatsink for the PWM and memory of the card, increasing stability at both high core and memory frequencies when using the stock air cooler.

Flipping the card over, we find three voltage monitoring points, one for PLL, memory and finally vcore. These can either be plugged into a new ASUS ROG board and monitored through overclocking software like the OC KEY or BIOS, or simply connected to a regular voltmeter if you prefer to kick it oldschool.

If you're not into the hardcore overclocking features, gaming is as you'd expect perfectly

adequate, if not downright impressive. Of course, AMD recently launched the new 12.11 drivers which managed to boost the HD7970 GHz edition comfortably above the GTX 680, so as you'd expect, this higher clocked card is leaving the Nvidia offerings for dead. If you're after the fastest single card solution, forget team green, an overclocked HD7970 on Catalyst 12.11 drivers is the top choice.

If 1100MHz isn't fast enough for you, we managed an impressive core clock of 1240MHz for gaming stability; all while maintaining temperatures under 70C with only 45% fan speed - something truly remarkable, and certainly worthy of praise. Pushing the card to its limits we managed clocks of 1270MHz for quick 3DMark 11 runs, though you're unlikely to get much more out of the card without moving to move extreme cooling methods.

Next up we took a look at the Hynix memory

modules to see what they can achieve if pushed by the Digi+ (CHL8228G) voltage controller. By default the Hynix chips are rated at 1500MHz (6000MHz effective) so we'd like to see numbers around the 1850-1900 mark. Unfortunately our sample didn't go past 1835MHz, but this likely has more to do with unlucky memory binning than any actual flaw in the card design, as the memory modules used on this card have been pushed to 1900MHz in our labs previously.

Overall, the ASUS HD7970 Matrix is a very solid graphics card. The design is well thought out, and we feel it has a true purpose in the market place. The three cooler design in far more justified than the regular DCU11, and we're big fans of the aggressive 1.1GHz factory-applied core clock. All that's really left to discuss is the price, and at roughly \$629, it is a very expensive HD7970, roughly 30% more than reference designed 7970's. We'll leave it up to you to decide if you can find value in this card at its current price. After all, it is still cheaper than the reference design when it first launched, so at least buyers can argue that point. (P) MW

## ASUS HD7970 Matrix Synthetic Benchmarks

Unigine Heaven, Avg - 35

3DMark 11 - 10343

Score

## ASUS HD7970 Matrix Gaming Benchmarks

Arkham City  
Battlefield 3

51-20

42-17

44-17

45-70

= Reference scores: Radeon HD7950

Frames per second

### Performance

It's up there with the MSI Lightning

97

### Bundle

A mouse mat is pretty cheap.

76

### Value

There are cards with comparable clocks and

81

### Build

Exactly the same as the standard 7970

89

### Overall

It's a beautiful card, but you're paying top dollar

86%



# Razer Death Stalker Ultimate

The latest keyboard from Razer takes more than a few queues from the Blade laptop – but is that a good thing?

**Street Price** \$350 **Supplier** Razer

**Websites** [au.razerzone.com](http://au.razerzone.com)

**Specifications** 1000Hz polling rate; Synapse 2.0 software; switchblade UI; 5 macro keys; 10-key anti-ghosting.

There's no doubting that the Ultimate moniker attached to the very fancy Death Stalker Ultimate is well-deserved. Straight out of the box, this is an imposing and heavy keyboard, boasting an array of unique features. It's matte black, with rubber highlights and sexy chiclet-style keys (which you'd normally find on a laptop) and an angular design that looks aggressive without being over the top.

Sadly, in day to day use, the very high price-tag of the Ultimate is very tough to justify.

## Size matters

Even though the Death Stalker is not a full-size keyboard – it's missing its number pad – it's still a very long board, thanks to the inclusion of the rather shiny Switch Blade UI. This sits on the right-hand side of the board, and is made up of a touch-sensitive LCD panel, and ten 'adaptive tactile' keys. This is the same system utilised on the very charming Razer Blade laptop; on that device, it works pretty damn well – on a keyboard, the experience is a little more trial and error.

But more on that later.

The Death Stalker Ultimate's not only long, but also quite deep, thanks to a permanently attached wrist rest. This is actually very well-designed, with a thick layer of highly tactile rubber that's not only comfortable, but guaranteed to help keep your hands in the same position game-in, game-out – it's just impossible to slide around on sweaty palms.

In fact, the entire keyboard is very well engineered. I've often found Razer keyboards to feel a little cheap, but the Death Stalker is very solid. It certainly looks like you'd expect a \$350 keyboard to look.

Though, it must be said that while larger and heavier keyboards are certainly handy – there a little easier to use, with more space between keys, and tend not to move around much in intense gaming sessions – but if you're gaming space is even a little cramped, the Death Stalker Ultimate may well be too big. If space isn't an issue, great – but there's more to be aware of.

[subhead] What the hell's a chiclet?

If you don't know much about the world of laptop keyboards, the term chiclet may well be more than a little odd. It's what those typically flat, square keys – with horrendously short travel – that you find on most modern laptops are called, and it's named after a brand of game that's, well, flat and square (and probably also has really

shallow travel). It's a space-saving measure for laptops, so the shallow, scissor action makes a lot of sense.

So how does it fare on a gaming keyboard?

Well, better than you'd expect, to be honest, and certainly better than it feels like you're doing. The shallow travel means you're getting very limited feedback on key activation, so it often feels like you may not be striking keys cleanly. In typing and gaming, this leads to a lot of double-activations, but the thing is you generally are getting clean strikes; it's just the poor feedback making it feel like a mis-key.

It certainly takes some getting used to, especially after using a mechanical keyboard for so long as standard, but it's surprisingly workable. I wouldn't call it ground-breaking – and it's certainly not on a par with a mechanical option – but it's better than we expected. That said, Razer's insistence on using non-standard alpha-numeric characters does make looking for certain letters a bit of a challenge – the standard characters are so ingrained that any change in design means you're almost learning the keyboard layout from scratch again.

## Keyboard to a knife-fight

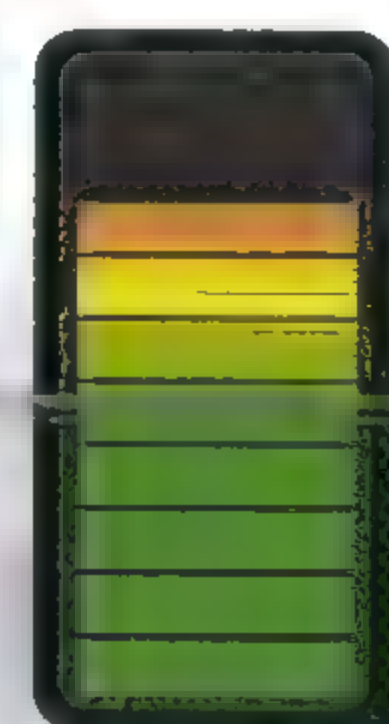
The Switch Blade UI is arguably the star of the Ultimate, though, and it's certainly what bumps the price up to such an impressive amount. It's without doubt very well made, especially the way the tiny adaptive screens in each of the ten keys is situated so that it appears clear from a natural angle. And it's certainly neat to be able to punch up Facebook or Twitter, or set up timers for key game events (like respawns in an MMO for instance), but the real pull is seeing the Switch Blade UI change completely to match your game, with custom keys and symbols.

At time of press, there's limited games available – Battlefield 3, Star Wars: The Old Republic, TF2 and one or two others, and while

Razer's opened the UI up for coders, the rather empty state of the official forums suggests we're not going to see a lot of development in this area, making the Switch Blade a bit of a white elephant if your favourite game is not on the list. Even then, I simply couldn't get BF3 to work. The Old Republic worked fine; however, it does take a little bit of retraining to get used to the different key layout.

And, of course, you can program the UI yourself, adding custom icons for whatever game you feel needs the extra love, and the UI is great for on the fly macro customisation. It's also handy to have the touchpad as a backup, especially if you often swap between mice (which is likely something not many people usually worry about).

Ultimately, though, it is bit of an unnecessary gadget. It's great on the Blade, where it's more tightly integrated with the overall machine, but on a keyboard it seems a bit cludgy, not to mention excessive in terms of cost. \$350 is a huge outlay for a keyboard that isn't even mechanical – quite possibly, too much of an outlay. It's a solid keyboard, but simply too expensive and niche, even for us. (DH)



### Overall

Very well made, but expensive and a touch buggy.

# 79%



# atomic

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# Plextor M5 Pro 128GB

Another player joins the SSD market, and we are impressed...

Street Price \$149 Supplier Plextor

Website [www.plextor-digital.com](http://www.plextor-digital.com)

Specifications 128GB Capacity, SATA 3, SSD,



As time passes we are seeing more and more SSDs move away from the use of the once great Sandforce controller and towards newer options on the market.

We have recently seen new offerings from OCZ, with its Everest series of controllers, and Corsair's new lineup featuring chips from Link-A-Media. There are also an increasing number of drives appearing that leverage Toshiba's faster Toggle NAND memory, which is still a MLC design, but capable of faster reads and writes.

Plextor has decided to go with Toggle-NAND and pair it with a Marvell 88SS9187 controller chip. As we have seen with other Toggle-NAND offerings, the results are impressive. We saw 4K-64Thrd performance in AS SSD hit 313MB/s write and 278.5 MS read speeds, making for a very zippy little SSD.

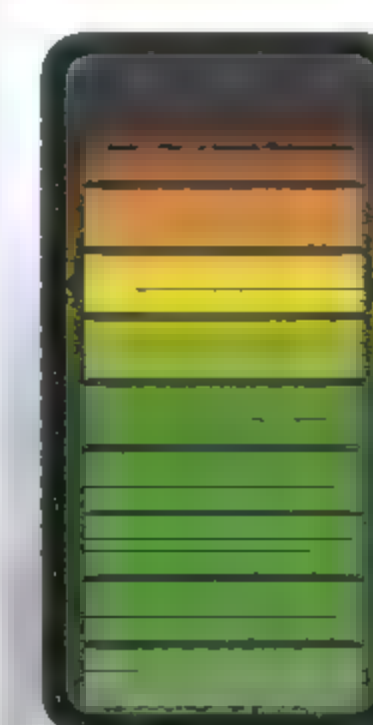
One of the more interesting aspects of Plextor's drive is that it uses a thinner form factor than

standard 2.5in hard drives. We've noticed a few models appearing in this thinner chassis size, most notably Corsair's more recent offering. Given that there are no moving parts inside the drive, and that heat really isn't an issue, it makes us wonder why all SSDs aren't being designed like this (or in the case of OCZ's models, why they are sold as separate versions to the mainstream drives).

We know that the Plextor SSDs have been popular in the past, especially overseas. But this is the first time we have seen one in quite a while, and suffice to say we are impressed.

The one thing that we think might work against this model though is the price. Though Toggle-NAND based drives tend to be more expensive than standard one, the simple fact is that Sandforce based Sata 6Gbps SSDs are available for much lower pricetags than this, and it makes it hard to recommend unless you absolutely must

have the fastest SATA version that you can find. Even then we'd tend to nod towards Corsair's Neutron GTX over the M5, but it is a close call. **JG**



Overall

A touch too pricey in our minds, but still a decent performer.

85%

# Creative Soundblaster Tactic 3D Rage

The name may be stupidly long, but the sound is good.

Street Price \$150 Supplier Creative

Website [au.creative.com](http://au.creative.com)

Specifications Frequency Response: 20Hz ~ 20,000Hz; Impedance: 32ohms; Sensitivity: 102dB/mW; USB 2

While we are certainly not adverse to flashing coloured lighting here at Atomic, we do wonder why there is such a focus on adding vanity lighting to gaming headphones. Not only does it tend to make one look like a bit of a dick, but the vast majority of implementations cause more trouble than they are worth.

For a set of cans that comes with fancy lighting, the Soundblaster Tactic 3D Rage is surprisingly light and comfortable. It is primarily designed to connect via a USB to Micro USB cable, but also comes with a headphone jack in case you want to use them with a phone or tablet. Of course, this means that you miss out on a few of the features, such as the fancy lighting and even volume control, which require power to work (you'll also unsurprisingly only be able to hear stereo, rather than the full surround experience).

We'd initially received the Wireless version of this headset to review, which ended up being recalled by Creative due to issues with the lighting

making a high pitched noise. Thankfully this wasn't to be heard with the normal model. Which is reassuring, because Creative has gotten a lot of things right with this headset. It isn't too heavy, the headband is comfortable and sturdy, and the entire unit has a reassuring amount of flex to it. The Microphone is completely removeable, and the cloth covered USB 3 cable is sturdy and stylish. Creative still needs to do a bit of work on its software, which required a restart for some reason while installing, but once done the headset worked just fine.

Overall the sound quality was great – like many gaming headsets it is skewed towards a more bass heavy sound (which works well for music if you like Beats-style bass over more cleaner monitor headphones). The surround audio worked well and the large ear pads were comfortable during long gaming sessions.

While we'd stay away from the Wireless variant for now, the Soundblaster Tactic 3D Rage is a decent surround gaming headset at a pretty reasonable price. And while the lighting is a feature that we could take or leave, it is at least subtle, and can be turned off if you want. It plays in a particularly competitive part of the market, but it holds its own. **JG**



Overall

Solid offering at a pretty competitive price

83%



# CM Storm Scout 2

Cooler Master's gaming brand aims at the low end.

**Street Price** \$110 **Supplier** Cooler Master

**Website** [www.coolermaster.com](http://www.coolermaster.com)

**Specs** 230 x 513 x 517.5mm (W x H x D); 8.3kg; 7x expansion slots; 3x 5.25in drive bays, 7x 3.5in drive bays, 2x 2.5in drive bays (converted); 1x 120mm fan (rear); 2x USB3, 2x USB2, audio; ATX, micro-ATX.

**T**here's nothing wrong with occasionally aiming for style over substance, but you do need some substance to back it all up. It's like wearing a good suit – not everyone can carry it off. It takes a little bit of skill and knowledge to dress it all up properly. The newest case in Cooler Master's CM Storm gaming range, the new Scout 2, is definitely aiming for the style side of the equation.

But as for substance... Well, that's a little trickier to pin down.

The Scout 2 is certainly a sharply-dressed character. The upper panel dominates the design, with a sweep of curves and arches over an attractive hexagonal, mesh-covered exhaust. This design's actually functional, too, acting as a carry-handle. It's bolted right onto the metal frame of the chassis, proving that Cooler Master will likely never make the same mistake that it did with the first CM 690 – if something looks like a handle, it really should be a handle!

Comfort's also been thought of in this well-designed feature – the handle's covered in a soft, rubber material that feels good on the hand and will help you keep a grip on the case while on the move.

In front of the handle are the machine's power buttons and IO panel. The buttons have a nice, deep travel that feels solid, and in addition to the power and reset ones, there's also a button to control the fan LED – an odd choice, given

there's only one fan, and it's mounted on the rear panel. The IO ports feature audio and a mix of USB3 and 2, protected by a sliding cover. It feels a little cheap, but then, that's pretty much what the Scout 2 is aiming for.

The hex design continues on the front mesh intakes, and the side-panel features a smoked window and two empty fan mounts.

If there's one big criticism of this case, it's that low fan-count. Sure, a lot of modern systems run a lot cooler these days, so if you're putting together a completely modern build, one fan may be enough. But we always think one intake and one exhaust fan are pretty much the minimum for any remotely gaming-grade build. Given there are cheaper cases, such as Bitfenix's Raider, that come with more fans, it's a hard choice to overlook.

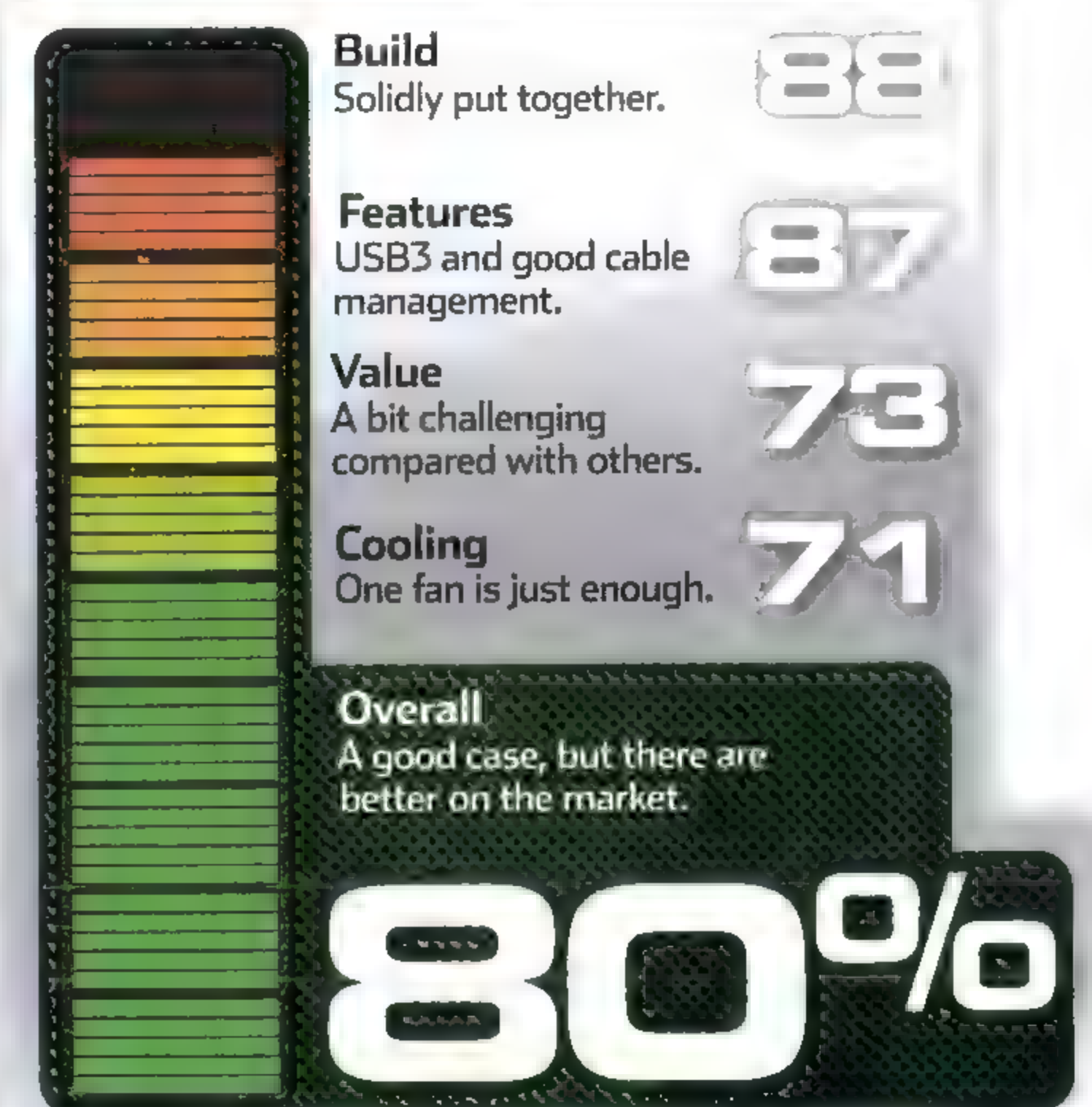
Internally the case is definitely well built and cleanly designed. There's a mess of room behind the mobo plate for cable management, bays for plenty of HDDs and even two SSDs if you're made of case, and if you remove the lower drive cage, you can even fit in video cards up to 399mm long. But, then we'd really recommend adding more fans.

It's a pretty clean interior, though, and for the price it's very well engineered. Rubber grommets



protect the cable runs, and there are rubber pads for your PSU (though with two intakes, and only one removable mesh panel to stop dust capture). And there are at least a lot of mounting points for more fans.

Ultimately it really feels like you're paying more for the design of the Scout 2 than the case itself. If that design is something you like, and the ability to easily lug your case is more important than coming with more than one fan, it's a very solid option. But on a raw price/features level, it doesn't quite stack up with other cases on the market. **DH**





# Razer Blade

Razer's first foray into full PC building is a mighty object of desire.

Street Price \$2999 Supplier Razer

Website [au.razerzone.com](http://au.razerzone.com)

**Specifications** 2.2GHz Core i7-3632QM • 2GB Nvidia GTX 660M • 8GB DDR3 • 1920 x 1080 17.3in screen • 500GB HDD + 64GB SSD • 802.11a/g/n • Bluetooth 4 • 3 x USB 3 • 427mm x 277mm x 224mm (WDH)

When we first heard about Razer's first foray into PC manufacturing we were incredibly sceptical. The first generation of Razer's Blade laptop had some fairly glaring issues, such as small storage capacity and a huge pricetag. It was also exclusively available in the US, a situation that is changing with the second generation Blade, which is receiving a limited release in Australia.

Now that we have actually laid eyes on the Blade, it is safe to say that our worries are a thing of the past. It is a truly gorgeous piece of hardware, a sleek 17in laptop that oozes style and makes some radical, yet incredibly intuitive, changes to the very fundamentals of laptop design.

Most notable is the 'switchblade' trackpad, which sits to the right of the keyboard. It takes the form of a touchscreen LCD panel, with eight configurable buttons sitting above it. By using Razer's Synapse software you can configure not only the display on the trackpad but the icons, and functions, of each of the buttons above. Razer has a bunch of profiles already for specific games like DOTA 2 and Battlefield 3, and the software autoswitches when the laptop detects a game being run.

By moving the trackpad

to the side, Razer has been able to position the keyboard in the middle of the laptop. This results in a design that is much more comfortable to use than other gaming laptops – you'll want to plug in a mouse for serious gaming, but the keyboard is remarkably useful. The other area in which the blade outshines other gaming models is in its thickness – at a mere 20mm thick, it

makes gaming laptops from ASUS and MSI look bloated and ugly.

This focus on design doesn't mean that the Blade sacrifices performance, however. With a Core i7-3632QM CPU, Nvidia GeForce GTX 660M and 8GB of RAM, it packs enough power to drive the 17in 1920 x 1080 screen. For storage, Razer has opted for a 500GB HDD and a 64GB caching drive, which delivers enough capacity to store a decent number of games while also being quite snappy and responsive. It's also worth noting that while our review laptop came running Windows 7, the Blade will be running Windows 8 when it hits retailers.

This hardware translates to a smooth gaming experience, even with the detail cranked up. Battlefield 3 ran without a hiccup at native resolution with detail set to high, and in our Crysis benchmark it easily managed 35fps at high detail and a near playable 22fps at very high. It may not have the pure grunt of the Radeon HD 7970M found in Alienware's top end M17X, but the form factor makes the difference in performance an easy one to swallow. Given there's only a bare handful of games that will push this machine, it's an easy choice for anyone looking for an alternate gaming device.

Of course, this performance does involve one serious compromise – namely that the battery life on the Blade isn't fantastic (although it is far from the worst we have seen). In heavy use tests it managed a mere hour and twenty minutes, while in light use it fared better with three hours and 34 minutes of life. This is par for the course when it







## ... the excellent thermal engineering that Razer's implemented on the Blade means that it never gets overly hot.

comes to gaming laptops, and you'll want to be relatively close to a power outlet when using the Blade – on the plus side, whereas most gaming laptops have hulking power bricks that weigh as much as the laptop itself, the Blade comes with a tiny brick that weighs only 390g.

However, the excellent thermal engineering that Razer's implemented on the Blade means that it never gets overly hot. It may drain batteries

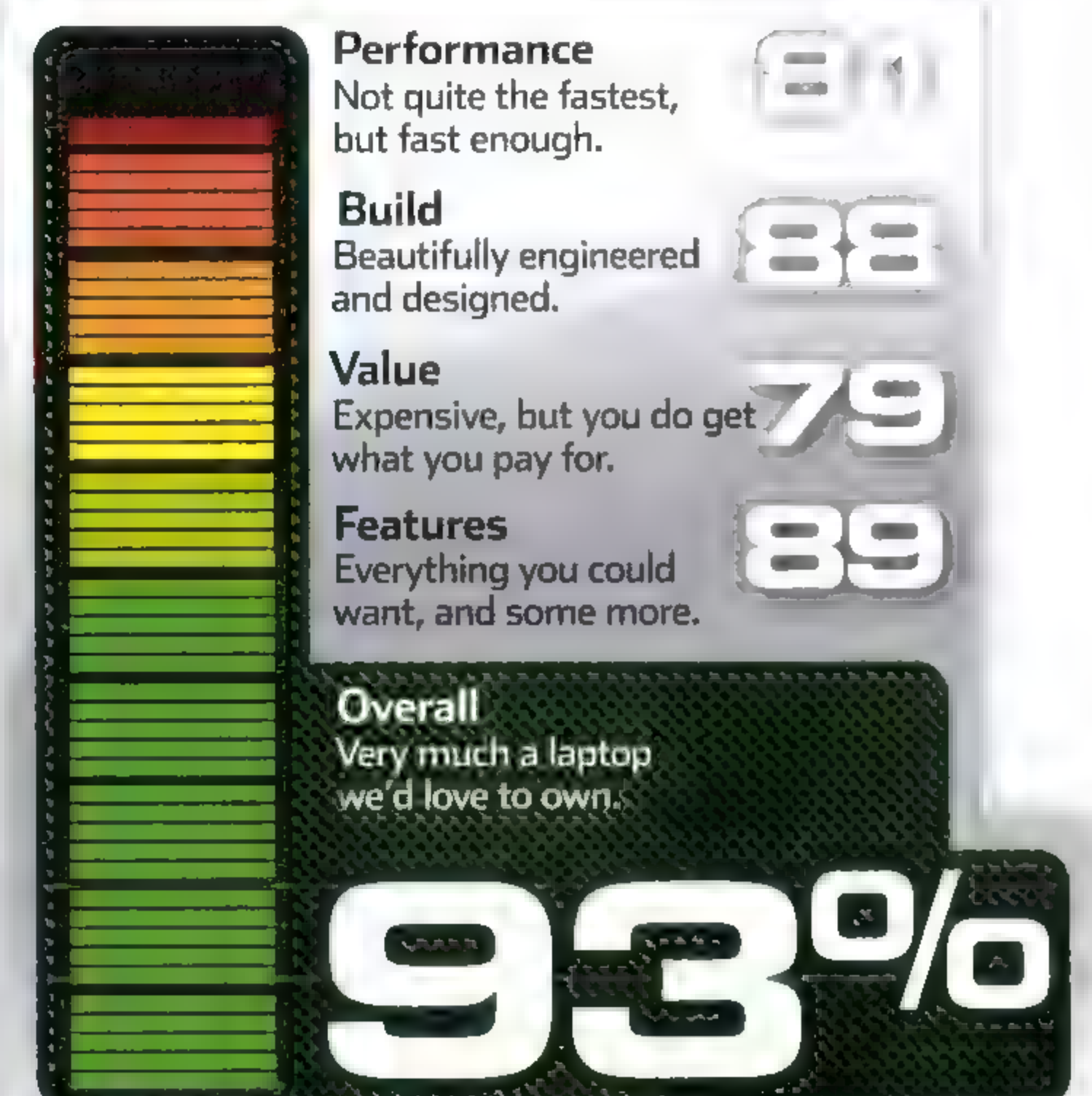
faster than many other laptops, but it'll sit far more comfortably on your lap, too. Given the smaller size, this is an impressive feat, and makes the Blade even more useable.

The overall slimness of the Blade makes it a truly rare beast – it's a gaming laptop that won't sit shackled to your desktop by sheer size. It comes with a fairly sturdy carry bag, and unlike the token bags a lot of

other manufacturers supply, we can see this getting a lot of use. The elegance of the Blade's design means you'll be as at home at a LAN as you will be sitting in a cafe getting some work done, or even playing a little sneaky BF3. And given the more than a little Mac-like looks the Blade sports, imagine the looks you'll get from your fellow patrons!

The Blade is a little slower than competing top-end gaming laptops, but the difference isn't enough to detract from its benefits. In terms of design and form factor it is way ahead of the competition, and while you pay a premium for the design touches it is well worth it. This is not a laptop for mere mortals, but if you want something with serious gaming (or CUDA) grunt, while retaining a sleek and stylish form factor, it has no equal. Not only is it one of the finest laptops to hit our labs in a long time, but it is the only laptop that we'd even consider spending \$3000 on.

It really is that special. (JP) JG & DH









# BUILD A STEAM BOX

Matt Wilson, John Gillooly and David Hollingworth cover every option you could possibly want to get a Steam box working in your lounge room.

**W**ith the launch of Steam's Big Picture Mode, it's time to ask: What's about time to turn a gaming PC into a lounge room? This special issue will want to cover the hardware, as some people may prefer the idea of a dedicated lounge room over performance. It's not for everyone, but it's a good idea to consider the console's needs. If you do have a specific purpose in mind, the information provided in this article will help you decide if it's a good fit for a PC in your lounge room.

At the same time, you'll also want to consider the design of the lounge room. It's not just about the hardware, but also the design of the lounge room. What if you're looking for a place to sit and watch TV with the rest of your family? You could also consider the design of the lounge room. Don't think of it as a place to sit and watch TV, but as a place to sit and watch TV.

There's a lot more to it than you think!



## General Aims

With the launch of Big Picture Mode in Steam there hasn't been a better time to assemble a PC in your lounge room. Parts are affordable, CPUs are running cooler than ever and the console market has remained stagnant for the last 4 years with no real innovation in sight.

The system we've assembled this month is designed to play any title on your TV at 1080P with a constant 40-60FPS, offering a superior experience to that of a console, with the added benefits and functionalities that only a PC can bring. The general role of this PC will be something of a multimedia centre, offering gaming, web surfing and jukebox duties as well as anything else you'd like included.

We're sure not everyone will agree with the hardware choices we've made, and for that reason we'll discuss each choice made throughout the article, justifying our decisions while also offering alternative solutions that should be considered for your very own build.

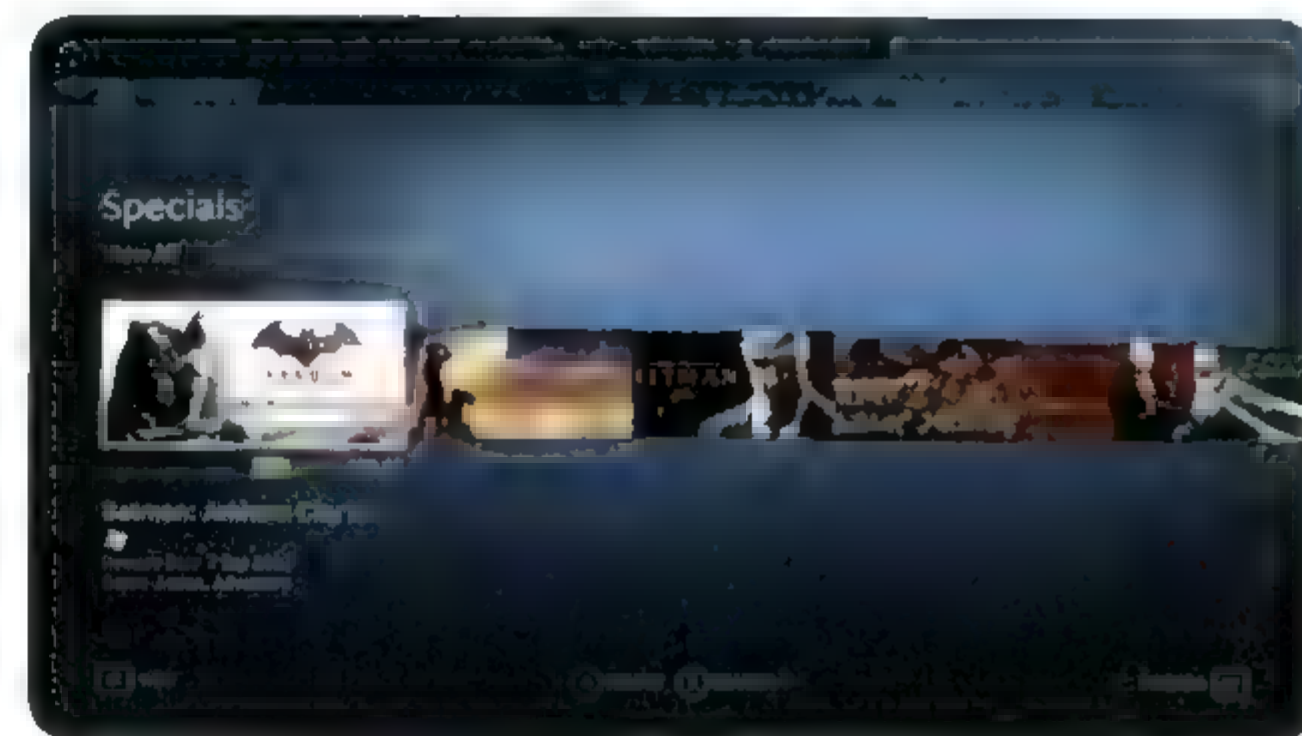
## Controllers

Playing PC in the lounge room creates new possibilities and also challenges to the PC gamer. It removes the shackles of a computer desk, but as the same time removes the familiar surfaces we're all used to. For this reason investing in console controllers may not be a bad call, especially if you're playing games that favour them.



With more and more games now being developed for console first, and PC second, you may be surprised at how a game can change for the better (please don't hate us for saying this) when you put down the mouse and keyboard, and pick up a controller.

Of course, certain titles simply play better on the mouse and keyboard, there is no denying it. So mini-keyboards should be remembered, along with specialised gaming pads. The biggest challenge for lounge room gaming is perhaps finding a flat and comfortable surface for mouse use. Short of a TV dinner tray or lounge with a swivel drink table, it can be rather hard to find an ideal solution for gaming sessions longer than a few minutes.



Logitech has a product line called lapdesk, and other manufacturers have similar products designed to let you use a laptop while sitting. Though they are designed for laptop use, not keyboards and mice, in testing it seems a lapdesk sitting on your lap, works quite well as a keyboard surface. While a second lapdesk resting on the lounge next to you can offer a fairly neutral mousing platform, that fits with your posture if you're sunk back into the couch. For others who prefer a more rigid (read correct) posture, perhaps investing in a pilates ball and using the coffee table will suffice.

Luckily with some in-house testing, we were able to discover a beanbag is actually a pretty good solution, as it allows you to sit in the exact posture you want, and a breakfast in bed table is often large enough for a mini keyboard and mouse combo, and if you're lucky has extendable legs to reach the floor either side of you.

The trick with controls for your personal setup is being creative, and looking at objects that usually don't have a primary function as a computing aid. You may be surprised what you can find that is already lying around your house.





## Jaw-dropping game thrills thanks to record-breaking performance

ASUS ROG MATRIX HD 7970 hits a great balance between spectacular power that's accessible and mod-friendly, classy ROG looks and out-of-the-box better gaming. It's one more step along the path to reality-grade graphics and makes the journey easier.

The latest MATRIX defies convention as a super-fast and extra-capable beast of a graphics card that continues the legacy of previous MATRIX behemoths to bring us one step closer to games that basically mirror reality. We can all stop holding our breath now: the graphics powerhouse we've been waiting for has finally entered our world, and its arrival is very much welcome.

### An agent of hand-picked quality

Let's begin with the 28nm AMD HD 7970 GPU. This was the first 28nm GPU on the market, bursting with AMD's Graphics Core Next architecture, DirectX 11 optimization, 2048 stream processors, and PCI Express 3.0. It packs the firepower of 4.3 billion transistors, but we know ROG was founded on going beyond specs, so MATRIX HD 7970 uses carefully-selected GHz cores for higher clocks. That means the 3GB GDDR5 behemoth is set to 1100MHz, an incredible 175MHz above HD 7970 reference. Framerates get an instant boost, so load up Fraps and rejoice.

### Precious alloy metal

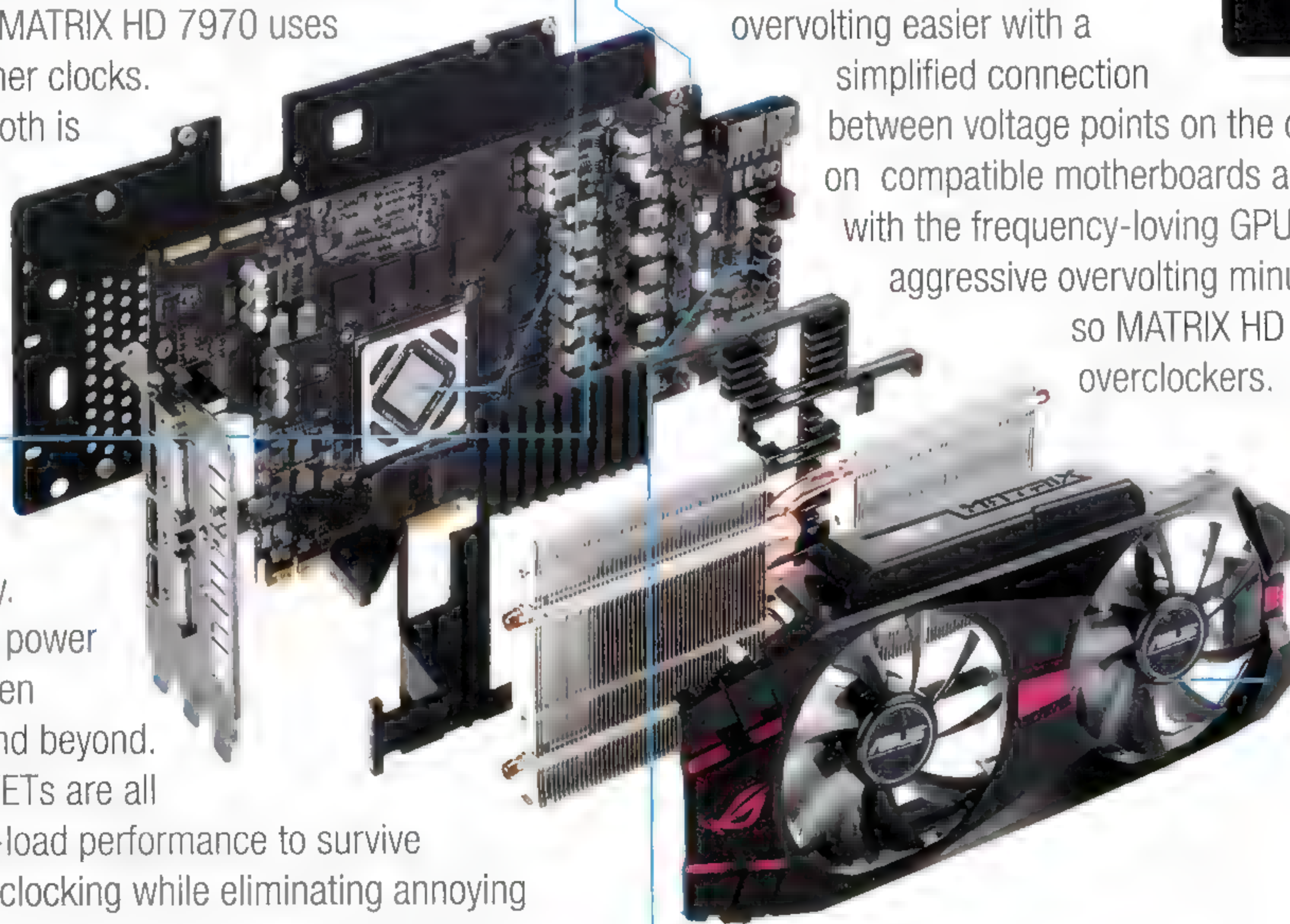
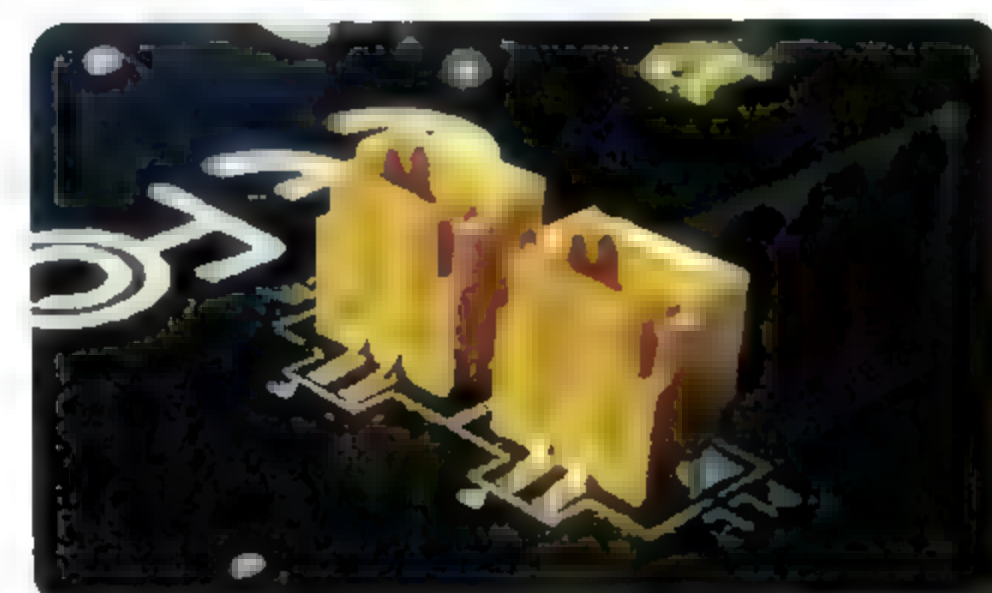
For power mongers, redesigned Super Alloy Power on MATRIX HD 7970 might be cause for tears of joy. Massive 20-phase delivery supplies power that drives the stability you need when overvolting or gaming on full ultra and beyond. Alloy Chokes, capacitors, and MOSFETs are all premium, forged in the fires of high-load performance to survive non-stop action and outlandish overclocking while eliminating annoying whine and buzz noises. MATRIX HD 7970 doesn't know what blowing a fuse means, leading to greatly extended durability.

### Jack in with comfort

For those who prefer leisurely software tuning, a new GPU Tweak takes advantage of MATRIX HD 7970's potential. It offers the world's quad-focus overclocking tool with GPU and memory tuning, overvolting, GPU loadline calibration and VRM overclocking. These are all staples of advanced overclocking, making it the most complete GPU Tweak yet, currently only available with MATRIX HD 7970. It keeps the user-friendly interface, so new and experienced speed demons are guaranteed results.

### All about easy control

MATRIX HD 7970 tacks on the tuning extras like it's getting ready for a revolution. We have VGA Hotwire to make DIY hardware-level overvolting easier with a simplified connection between voltage points on the card and dedicated headers on compatible motherboards and the card itself. Combined with the frequency-loving GPU, VGA Hotwire results in aggressive overvolting minus the eye-straining soldering, so MATRIX HD 7970 is ideal for serious overclockers.

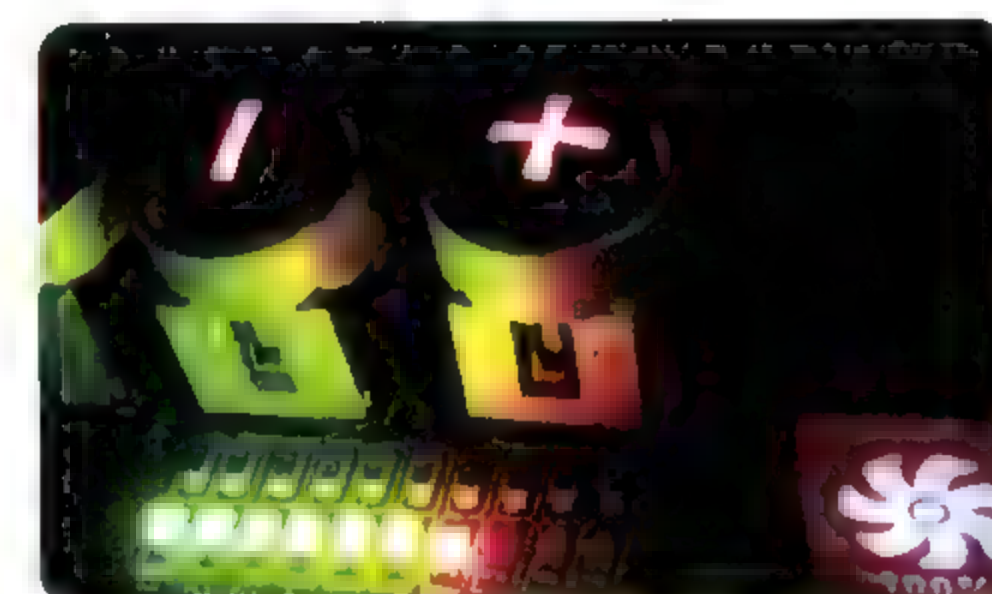


### MATRIX-HD7970-P-3GD5 (Platinum Edn)

Graphics processor  
AMD Radeon™ HD 7970 GHz Edition  
Memory  
3072MB GDDR5  
Engine Clock  
1.1GHz (boost clock)/  
1.05GHz (base clock)  
Input/Output  
1 x single link DVI  
1 x dual link DVI  
1 x HDMI via adapter  
4 x native DisplayPorts  
Dimensions  
11.4" x 5" x 2.6-slot

### TweakIt like you mean it with added safety

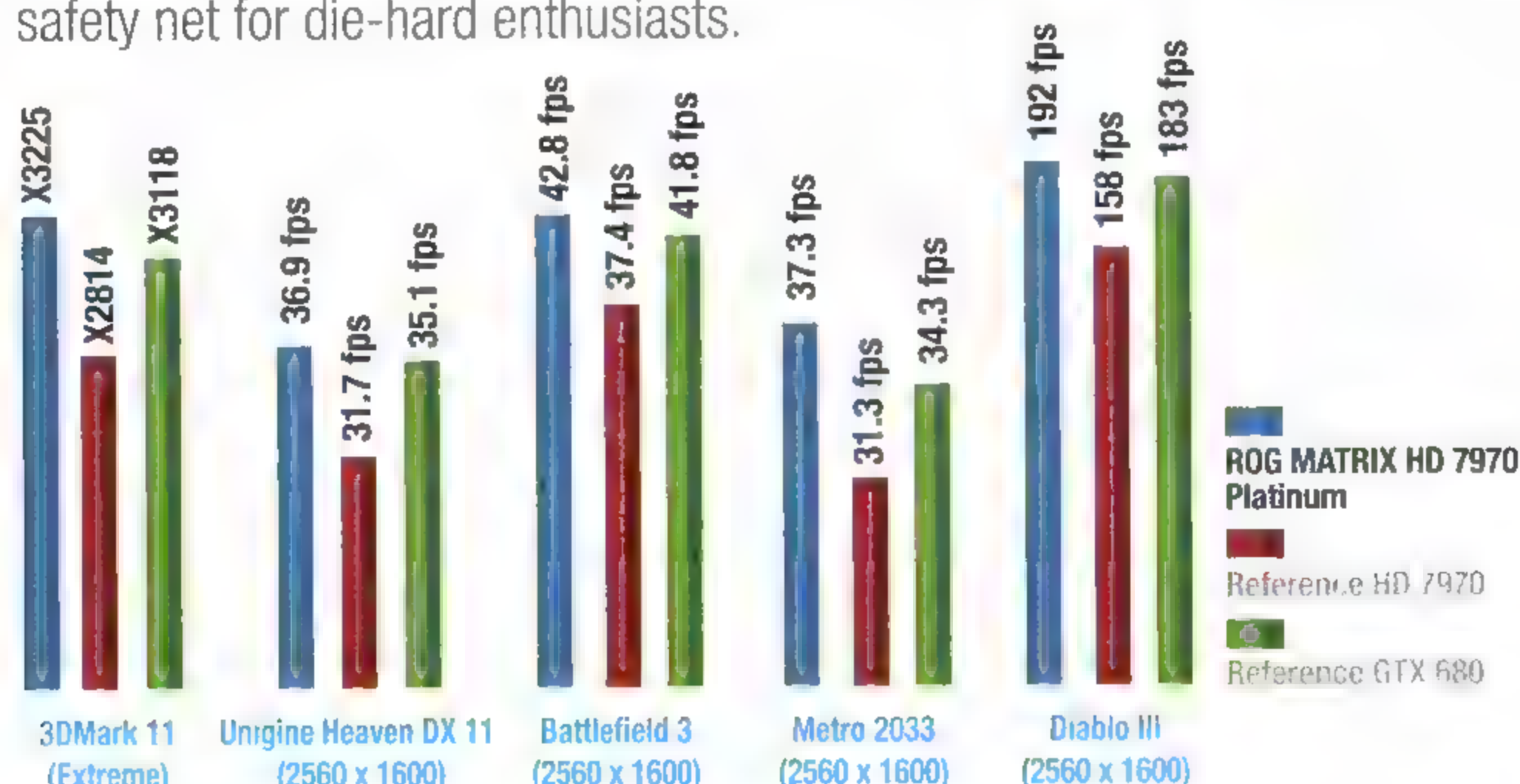
Exclusive TweakIt presents a powerful card modification tool that allows you to change voltages by simply pressing the + and - keys. We also get one-press 100% fan speed activation for those intense moments when heat needs to be banished quickly, driving 6X greater airflow than reference. These make MATRIX HD 7970 a muscle card fit for new world performance records, but if the attempt requires careful planning, handy Safe Mode dials everything back to factory presets, so should an overclock prove unstable, it acts as a safety net for die-hard enthusiasts.



▲ Adjust hardware voltages in real-time by pressing the "+" and "-" buttons - just like using a paddle shifter to change gears instantly.



▲ ROG GPU Tweak suite offers the world's first graphics overclocking tool with loadline calibration and VRM overclocking.







## CPU

When deciding on the CPU, it's important not to get carried away. Being Atomic it's hard to resist the gravitation field pulling us towards the mighty i7 3770K and the overclocked performance it can boast. That however wouldn't be the correct decision to make, well, at least not for everyone.

You see, being a small system, you should be looking for balance, that means in terms of performance, cost, power draw and heat output your system should not lean too heavily towards any of those four criteria, and should instead sit somewhere in the middle of a plot field.

We decided that a core i5 3470 was a good middle ground, costing around \$189 online. We of course tossed up between AMD offerings, as budget CPUs are still in fairly heavy competition. In the end we decided against it, as AMD is on average drawing more power per core than Intel, and given we're working with limited cooling, decided Intel was worth the small price bump for the more efficient CPU.

Another choice was between dual-core, dual-core with HT and our quad core we settled on. No doubt a Dual-Core can still game more than adequately. Just look at comparisons users on OCAU post between 4GHz E8600 and a CPU like the i7 920. A lot of the time the E8600 will actually come out on top. However, if there is heavy AI coding within the game, or CPU-bound physics, you'll quickly find the extra cores and HT can offer vast performance gains.

If you're on a tight budget, the i3 3220 is a fine choice indeed, and will likely play most of the popular titles just fine. If you're building a PC for some casual gaming in the living room, and still have a dedicated gaming PC

for more demanding titles, the i3 3220 should be just fine. Likewise a second hand Phenom II X6 would be an arguably superior pickup if you can find one for sale from a reputable source.

Another reason we went with Intel over AMD is the added benefits of Rapid Storage and Smart Response. AMD now offers similar features on some motherboards and CPU lines, though from our experience they're not yet as refined or supported as the technologies on

offer from Ivy Bridge. This means you can set up a cache drive easily, offering SSD-like performance for a single HDD in your system, or if you prefer, optimise boot times further by using a dedicated SSD as your system drive.

Unfortunately for some, overclocking is out of the question unless you pick up a "K" SKU from Intel's new CPU line up, or roll with an AMD CPU. Another alternative for people still wishing to overclock would be picking up a legacy 1156 CPU, such as the i5 750. It will be more than adequate for gaming at stock speeds, and should see your overclocking appetite fed.

Unfortunately they are only worth buying second hand, as brand new you're better off with a current generation chip. If you do decide to go down the second hand road, either with AMD or Intel, remember to check motherboard compatibility, and the sellers reputation.

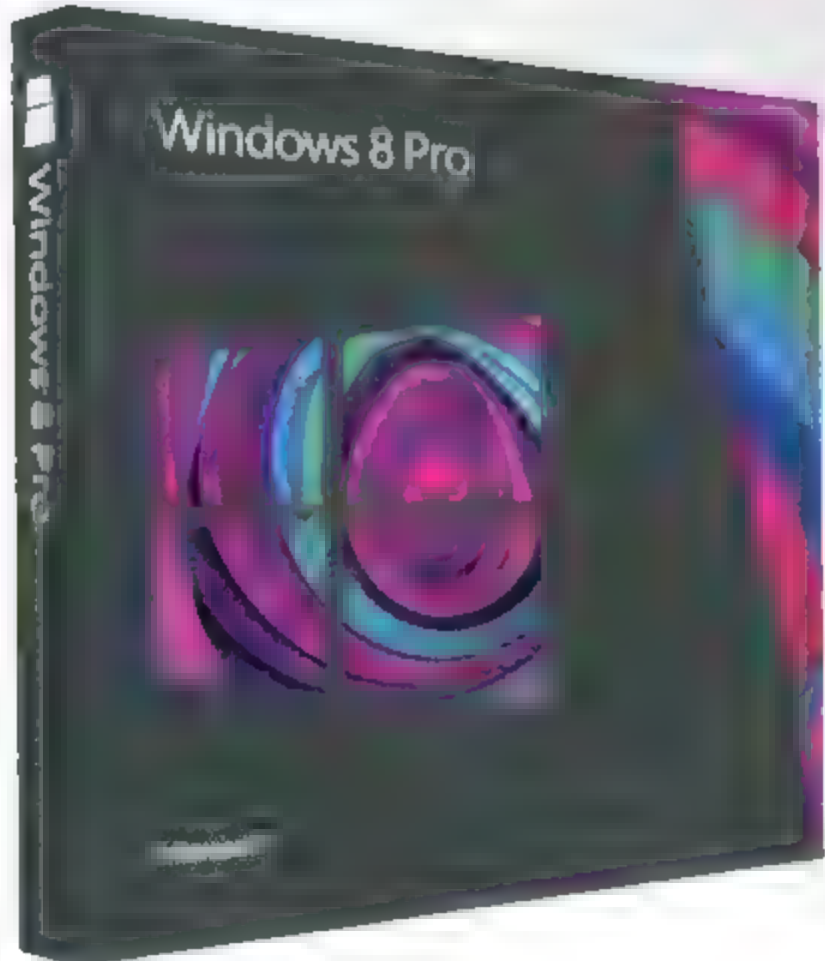
## RAM

Selecting RAM used to be a big part of building your system. Commonly people were concerned about ram frequency and cache timings, and were willing to spend big money to improve memory performance.





## Operating System



Even though Steam is in beta on Linux (complete with Big Picture mode), for gaming you are still better off using Windows due to sheer compatibility.

We'd suggest at least Windows 7, but actually lean towards Windows 8 for a TV build. The 'Windows 8 UI' may not look great on the desktop, but it works surprisingly well on a TV, and you can create tiles linking to commonly used programs, saving you the hassle of distantly mousing to stuff on the desktop. We've encountered no issues so far with Windows 8 and Steam, so it's well worth considering.

With desktop RAM speed so fast now, especially when compared to the console market, we're simply seeing reduced benefits to owning such fast kits.

Generally speaking all the average user needs these days is a 1333MHz kit, with cache latency 10 as this is the stock speeds for many modern CPU's today. Buying a 1600MHz or even 2400MHz kit won't make a lick of difference unless you overclock the CPU's Internal Memory Controller in order to make the RAM run faster. Something many people are guilty of, is buying high performance RAM, and assuming it will run at those speeds automatically.

Our buying advice when picking up a new kit

is fairly simple. Stick with a reputable brand, as claiming warranty may become important in the future (many offer lifetime warranty now), and compatibility with motherboard BIOS revisions is almost guaranteed. We'd suggest brands like Corsair, Kingston or G.Skill for memory, as they now have the highest vendor BIOS support.

As for capacity, chances are 4GB will get you by for the next 12 to 24 months, though with prices what they are, there is really no reason to stay away from a new 8GB kit. Moving up to 16GB is cool for bragging rights, but it's simply not needed on a gaming PC. If you're trying to save money on the build, a 1333-1600MHz 8GB budget kit is all you really need to consider.

## Motherboard

We decided on the new B75M-D3H for our motherboard, this was largely due to cost and simplicity. We didn't need any bells or whistles as we're not overclocking the i5 3470 (it has a locked multiplier), and we don't have a huge list of required features in order to build our fairly simple system.

What you really want to look for in a motherboard is the basics, and anything you think is a truly valuable feature.

M-ATX is almost a necessity when building a small PC for the living room, and the B75M-D3H fits the bill nicely, offering more than enough USB, SATA and PCI slots for use in our system. If you don't need the second PCI Express slot, you may wish to even consider a M-ITX motherboard, such as the Z77-WiFi from

Gigabyte.

More avid gamers may wish to look towards the ROG or G1 series from ASUS and Gigabyte respectively, as both companies now offer a gaming focussed M-ATX motherboard, sporting superior networking, audio and of course bundled software to help you configure your system. We would usually suggest picking one of these boards up, and if you were using this system as your primary build, it's definitely worth considering, but if the Steam Box is a secondary build, it's likely best to keep things a little cheaper.

What you really want to look for in a motherboard is the basics, and anything you truly think is a valuable feature. It's very easy to get caught in the trap of buying an expensive motherboard because you've heard it's good, or merely assume it's better because of the price. Think about the things you need, and then buy the board.

For example, do you need wireless functionality? If so, are you happy to obtain it via a PCI card or USB? If so, make sure you

have enough free space to fit that, if not, there are many boards available now with wireless inbuilt. It would be a waste however to buy a board with inbuilt WiFi if you have no need for it. This all may sound obvious, but believe it or not Australians are the world leaders in over-specing their PCs.





## Video Card

Suggesting the ideal card for a system like this is hard, as everyone has their preferences of GPU manufacturer and third party vendors, as well as their own understanding of acceptable frame rates and what is considered "good value".

In our build today we've installed a GTX 670, mainly to show that HTPC cases are now built to accommodate such cards, and also to show that powerful cards (well, ones that aren't produced by ASUS) are getting physically smaller.

Originally we were going to use an overclocked HD7870, which is almost exactly the same length as the GTX 670 OC from Gigabyte. If you're only chasing mid 30-45 frames per second on average, the Gigabyte

HD7870 OC is a very hard card to beat, especially considering its now on sale for under \$260 online, while the GTX 660Ti bottoms out at around \$320 for a "budget brand".

The reason we ended up settling on the GTX 670 was for the simple reason that we had one in the office, and it should offer enough performance for years to come, as with a build like this, it's really the kind of PC you leave stashed under your TV for years, not one you open up every month or two to dust out and tinker with.

When selecting the video card that's right for you, the most important things to remember would be card length and power requirements. There is nothing worse than buying a 31CM video card, only to find out your case has 29.2cm of PCI space. A close second would have to be checking where the power sockets

sit on the card (top or "end") as this will also take up additional room once the PCI power cables are connected. Finally, you want to ensure you've got enough grunt in your PSU to power the system stably.

These days it shouldn't be a problem, as reliable 600W PSU's should cost you no more than \$100 (more on that later).

Beyond the physical size of the card, the next most important thing to look at (or should we say listen for?) is the noise output of the fans at both idle and load. While we are well aware that programs like MSI Afterburner are commonly used to create custom GPU fan profiles, it's ideal to find a card with good stock profiles, reducing noise

**If you already have a nice stereo system in your loungeroom, then a dedicated soundcard is your likely next move.**

on startup, and also removing the reliance on software for your machine to run within your noise tolerance.

The two things that separate most video cards on the market is where or not they are rear-exhaust (closed shroud) cards, or if they are internal exhaust (open shroud) cards. Ideally, a closed shroud cooler will perform better in a tight environment, as it should dump hot air outside of the case, helping to reduce case ambient temperatures. If however, you have adequate case airflow (3-4 case fans), then it's a good bet you're moving enough air internally to cater for an open

shroud design, which is a more efficient cooling method despite dumping hot air inside the case.

## Sound

While sound will be more important for some, the Realtek ALC887 audio chip used in the Gigabyte B75M-D3H is enough for most gamers and movie watchers out there. Sure, in this case you're restricted to 2.1 channel audio on the rear of the motherboard by default, but the ALC887 supports up to 7.1 Channel audio, meaning if you pick up a 7.1 Channel front panel header, or rear PCI plate, you can access the full audio bandwidth the chip is capable of. For most people though, 2.1 is fine assuming you're using your television for sound, or you're simply hooking up a pair of bookshelf speakers.

We'd suggest spending more money on a good set of speakers than upgrading the sound card in the PC, as you're far more likely to notice a difference in speaker quality using the on-board sound than you will notice by upgrading the sound card; continuing to using those old Logitech speakers you picked up at Dick Smith in 2001 is a bad idea.

If you already have a nice stereo speaker system in your living room, and you want to maximise the benefits of that, then a dedicated sound card is your likely next move. For us the best value card on the market (that is actually a noticeable upgrade over modern on-board audio) would have to be the ASUS Xonar Essence STX. This card is among the best on the consumer market, and generally speaking should only cost you half as much as the others.

The power shielding is great (useful in a small build if sandwiched in between a GPU and PSU), the Burr Brown 1792 DAC is one of the best digital to analogue converters on the market and

to top it all off it is also one of the best sound cards we've used for headphones (should you want to spare the rest of your household from your gaming).

Of course, this card doesn't come with the 7.1 audio jacks that many people are used to seeing, and if you plan on using a 7.1 system you will need to use their amp as normal, merely using your PC as an auxiliary device. If you're after a card that supports 7.1 playback out of the box, with all of the appropriate rear connectors to plug directly into your speakers, the short answer is that you're stuck using a card like a Creative Sound Blaster.

What's the problem with this you ask? Well,







nothing really as Sound Blaster has been a respected brand for decades, though it's also providing the vast majority of on-board sound these days, so you're not really upgrading, merely spending \$40-\$70 a couple more 3.5mm audio jacks for you cheap pair of speakers.

## Storage

If there is one thing we've seen change more rapidly over the past decade of home PC usage it's got to be storage. We've seen the rise and fall of the Western Digital Raptor as a "must have enthusiast drive", the 10KRPM SCSI drives had their heyday, RAID 0 went from the ultimate e-peen to a complete waste of time as soon as flash memory became an affordable option in the form of SSD's, and to top it all off, NAS storage is now at a place it's never been before, offering Terrabytes of storage for your entire household or greater network to share and enjoy.

Of course, all of the technologies mentioned earlier still have their place, and people still use them, or iterations of them in the professional markets, though as "geek gear" they've largely all become irrelevant as high density platter storage is now the preferred method of cheap multimedia storage, and ultra-fast SSD's have taken up the role of OS and caching. For this reason, it's largely up to you (as always) which road you go down when building a media PC.

Our ideal box would have a single SSD and nothing more, simply streaming all other content

across the network (assuming you're using a Gigabit LAN). Of course, some users may prefer to keep their Steam folders locally on each PC, but we think a better solution is to have a central NAS which can be accessed from any PC in the house, meaning you don't need to download and update the same game numerous times over each PC in your house, it's all stored centrally.

The same is said for media use, movies, photos and music can all be stored on the home network, giving tablets, phones and laptops access to your movie library at any time, in any room. In short, the NAS is probably our favourite new addition to the 21st century home as it really ties your entire tech catalogue together.

If you're more inclined to stick with in-box storage, you should need little more than a 2TB 7,200RPM drive from your preferred manufacturer (we'd suggest Western Digital), and a fast SSD for the OS load and perhaps your favourite game or two, which

## Ghetto Cloud Saves

One potentially frustrating thing with jumping between two PCs is going to involve managing your savegames. If the titles natively support Steamcloud then this is easy, but if they don't support some sort of online saving then you'll likely run into trouble. Even running Steam over the network from your desktop PC won't fix this, as most savegames are saved inside your Windows User folder. We are currently experimenting with a few solutions for this and will be returning to the concept next month with some Software tips and tricks revolving around managing your savegames.

in this case we've selected an OCZ Vertex 4 240GB SSD, one of the fastest drives currently available.

An alternative option however would be to simply use a 30GB or 60GB SSD as a "cache drive", using Intel RST. This method should give close to SSD performance, without the "reliability issues" that SSD's have famously suffered from over the past 2-3 years.

Whichever way you choose to build your system, remember the main importance is to keep your operating system on the fastest drive possible, for everything else, a modern 7,200 RPM drive should suffice.







## Case

As we touched upon when discussing GPU options, the case is one of the most important hardware choices when building a HTPC or small system. If you miscalculate dimensions you could end up with a case larger than you actually needed, or worse, much smaller.

The most important things to look at when picking your case, is the amount of room you will have for PCI devices, this includes not only the amount of PCI expansion brackets on the rear of the case, but also the amount of room for video cards and other PCI devices. Remember when measuring up your ideal case to allow for PCI power cables, as they can easily add an extra 2CM or more to the top or rear of the cards length.

Hard drive storage is the next most important area, as it can add a lot to case size, and if it's not required, you may be able to fit your new build into a smaller chassis. It is also important as these days many cases have removable HDD trays, making room for longer video cards or perhaps taller CPU coolers depending on the case layout.

When looking at HDD storage potential it is also worth taking note of 2.5" drive support, as some cases may need to use a 2.5" to 3.5" bay converter (most SSD's come with them), or possibly even a 3.5" to 5.25" converter, should you decide to make use of any vacant optical drive space.

Aside from the internal offerings of a case, this particular build also needs to look attractive in your living room, or wherever you plan to have your "Big Picture" box set up. This rules out a vast majority of M-ATX cases, and leaves us with the option of more rational (read VHS-style) HTPC cases if you plan on storing the PC in a TV unit, or a stylish tower build if it's to sit alongside your furniture.

To get you off on the right track, Lian Li make a large variety of M-ATX tower cases

which should fit in well amongst other living room furniture, while companies like Antec and Silverstone have been making compact slim-line PC cases for a long time, and are now starting to offer some half-decent HTPC-focussed offerings, like the Grandia GD05 we settled for in our build.

## Cooling

Fan choice may seem like a rather insignificant part of PC building, and many people simply choose to just keep whatever fans were provided in the default layout, without even so much as a consideration to their RPM, airflow and noise levels.

For a PC that is going to be doing its fair share of media playback, you really want it to be as quiet as possible. This meaning picking up some decent case fans if it's within your budget, or buying a case that has good quality fans already installed.

Noctua have famously made some the best "silent" case fans for the last seven years, though they are expensive and with a little ingenuity you can turn your stock fans into something worth keeping. The first thing that you can do in order to turn your noisy stock fans into something better suited to HTPC cooling is to put a voltage limiter (correctly known as a resistor) cable in place, reducing the fans voltage draw, and therefore limiting the maximum RPM of the electric motor within.

Depending on your case fans, this step may not be necessary. If the 120mm fans inside your case are running at 1200RPM or above, we'd suggest trying to bring that number down below 1000RPM, as it will help drastically reduce the noise generated from airflow, and any "whine" from cheaper electric motors. If you're already using 120mm fans that are operating under 1200RPM, it would be worth giving them a try without any resistors in place to check their audibility, and adjusting later.

For smaller and larger fans, the general rule of thumb is the smaller the fan the noisier

it will be, as the motor will generate more noise to hit the higher RPM required by smaller fans to cool the case or hardware adequately. For this reason we try to avoid using fans under 120mm, but if you don't have a choice, we'd say 90mm is the absolute cut off for a media PC, as anything smaller will either be too noisy, or if slowed down to silent levels will fail to move adequate air.

Large fans like 200mm monsters becoming more common in full sized ATX towers can be useful if supported by your case, as a low operating speed of around 700RPM should be near silent, whilst still moving vast volumes of air through your case. Of course it is often hard to fit fans of this size into compact cases, though if there is an option for one inside your build, it should certainly be a consideration.

If your fans are running too fast and you can't find any resistor cables at your local PC store, the other option is to control your fan speed via software, using a dedicated fans speed





controller, or the most drastic measure would be to cut the black ground wire, and the red live wire, soldering both together, forcing the fan to run at 7v instead of 12v. Of course, most people would rather use the any of the previously mentioned methods over resoldering their fans manually.

## PSU

The power supply is often the most overlooked part of a system build. OEM manufacturers are certainly guilty of it, and even your local PC store will likely throw in a cheap PSU over a reputable model as they can usually get good deals on bulk purchases from companies like Shaw.

Now, we're not going to go on a rant saying which companies will kill your PC in a glorious explosion of silicon-laced smoke. But we will

efficiency.

Another important thing to remember when we talk about efficiency is that it changes depending on PSU load. This means at 20% load your PSU may only be 86% efficient, yet at 50% it's managing an efficiency percentage of closer to 93%. Most consumer PSUs achieve their best efficiency when operating between 45 and 60% load, meaning it's better for efficiency if you slightly over spec your power supply. For reference, our system was drawing roughly 300W at peak load while gaming, meaning a ~550W PSU would be perfect for this system if we wanted to achieve maximum efficiency.

The next important specification to look at is the amount of connectors available, and also their amperage. The reasons for checking available cables are rather obvious, as you

## Most consumer PSUs achieve their best efficiency when operating between 45 and 65% load...

tell you what to look for when putting your PC together, and what some of the key differences between PSU models are.

For our build, the most important thing to look for was efficiency. Being a HTPC / Console replacement system, it's fairly safe to assume this PC will be on for a good portion of each day, watching movies, playing music or loading up some games. For that reason increased efficiency may actually have a positive influence on your quarterly power bill, as well as slightly lower operating temperatures.

For Atomicians who aren't quite sure what a PSU efficiency rating is, put simply it's a measurement of how efficiently your PSU converts your average households 10Amp, 240Volt wall socket power source into a low voltage, high wattage and amperage source of power for your system to run off. In this conversion, heat is a by-product, and the more efficient this conversion process is made, the smaller the amount of energy lost as heat becomes. This is important for two reasons, the first is you generate more power for your PC from less input (you save power), and the second being less heat escapes from the PSU into your PC case.

Normally anything above a 80+ bronze rating is more than adequate, as each ranking (White > Bronze > Silver > Gold > Platinum) only improves by around 3% efficiency at each level, and you can spend a lot more money moving yourself from 80+ Silver to 80+ Platinum for very little actual gain in

want to be able to power all of your devices within your PC. However amperage is an often overlooked specification of power supplies, and is often the reason cheaper ones give up their puff under heavy load.

High performance PC parts, especially CPUs and GPUs require a high amperage (by comparison to other parts) power supply to run correctly and when you overclock these parts that need increases exponentially. If the power supply you plan on using only has 10Amps on

## Controller

One of the key parts of using a PC as a console replacement is ensuring that you interface in a method becoming the lounge room. This means using a controller. Our recommended solution is Microsoft's Xbox 360 Controller for Windows. This is available in both Wired and Wireless configurations, and we'd go for the Wireless version even though it costs a touch more.

As an alternative take a look at Razer's Onza controller, which works with both Xbox 360 and PC. An Xbox compatible controller like this is ultimately going to give you the best experience due to the way games are developed.

the 12V rail (the rail PCI express uses), then you may find the power supply shutting your system down under heavy loads if your GPU is hungry enough. It can also be the cause of catastrophic failures of a power supply, as it struggles to generate the required amperage of a high end GPU, causing capacitors to pop, and possibly spiking voltage, amperage or wattage to dangerous levels, frying any attached hardware in the process.

This is of course less important on smaller builds, as they more commonly use lower powered parts, and typically aren't overclocked. Though it is always important to check the amperage available to the 12v rail(s), and make sure it's adequate for your specific system.







## Hardware List

**CASE:** Silverstone Grandia GD05 \$105  
**GPU:** Gigabyte GTX670 Overclocked \$435  
**MOBO:** Gigabyte GA-B75M-D3H \$72  
**CPU:** Intel Core i5 3470 \$189  
**RAM:** Corsair CMX8GX3M2A1600C9 8GB (2x4GB) DDR3 \$45  
**SSD:** OCZ Agility 4 256GB SSD \$175  
**HDD:** Hitachi Deskstar 7K1000 1TB 7200RPM 0F15632 \$79  
**ODD:** LG BH14NS40 14X BD-R Blu-ray Writer \$89  
**PSU:** Antec EA-650 Platinum Power Supply \$119  
**TOTAL: \$1308**

## Build Order

In this part of the article we'd like to walk you through the finer points of the build, why we made some of the hardware choices we did, and also offer some alternative options should you decide you want to do things differently.

The first thing you want to do when building a system is laying out your parts and making sure you have everything you need. This includes basic tools like screwdrivers, needle nose pliers, wire cutters, zip ties and a few hours of uninterrupted time.

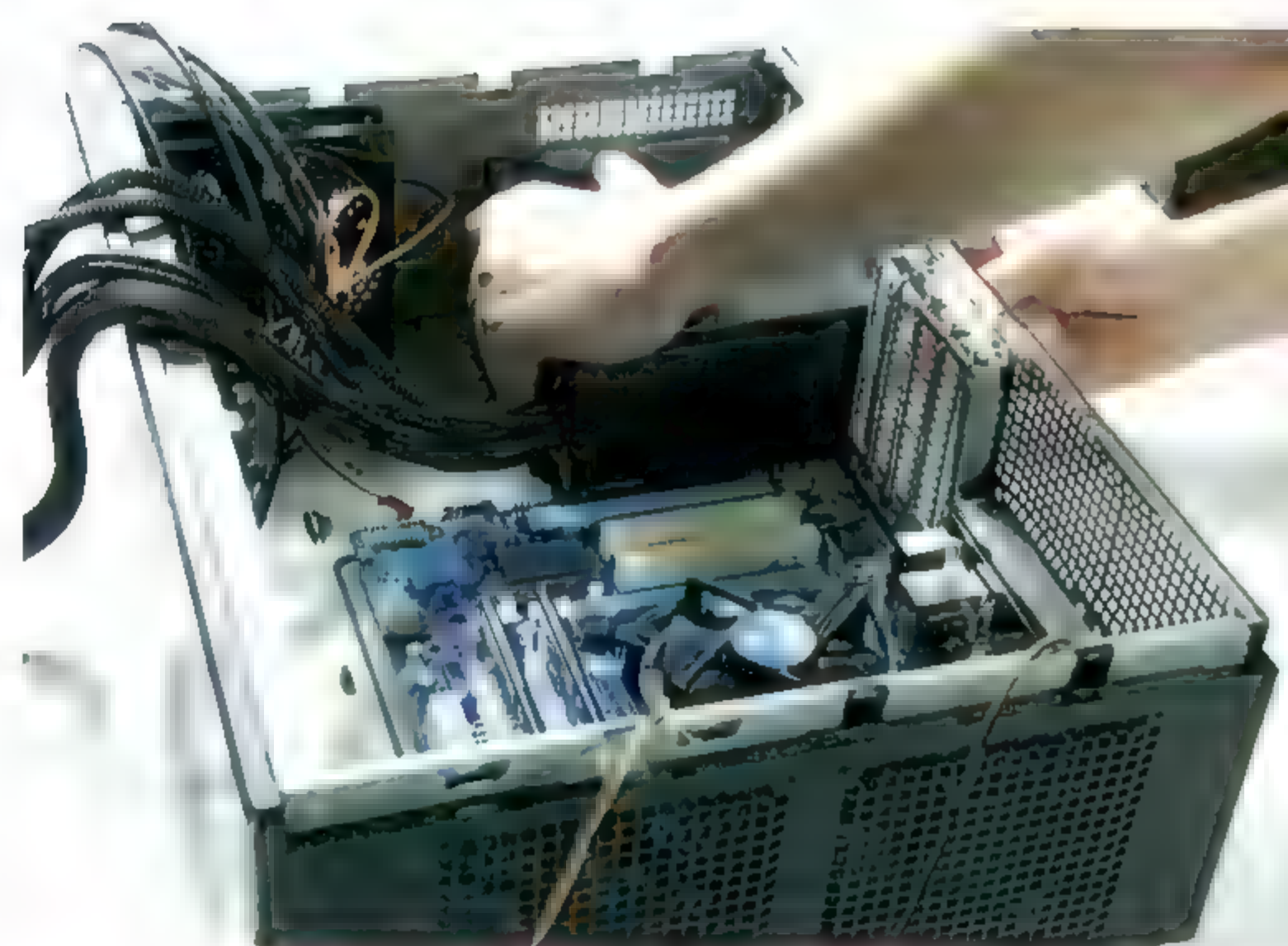
Prepping the case is the first task of the build, and you should have a good idea of exactly where everything is going to go before you begin. This way you can route cables before too much hardware is in the way. Typically I like to install the CPU into the

motherboard, and mount the cooler outside of the case if I'm working with an aftermarket cooler as the back plates can be hard to work with once within the PC case. In this instance however we're using the stock cooler due to the low heat output of our CPU and the fact we're not overclocking at all.

Once you've installed the motherboard, I typically plug in all case and front panel cables before moving on. It is wise to bunch all of these together into as tight a group as possible, and use zip-ties to neaten up any stray cables. This will save you wrestling them out of the way later on in the build.

From here we move on to installing the hard drives and optical drives. In most cases it's pretty straight forward and the case manual should be able to tell you how many drives you can fit, and exactly where they can all be mounted (if it isn't glaringly obvious). In our GD05 however, there isn't a huge amount of hard drive storage to be found, only room for our SSD and a single HDD. This was intentional when selecting out case however, as the system was intended to interact with a modern home network, complete with a Windows based server.

It is important that you connect each SATA device in order. The numbering usually begins at 0, being the primary SATA device, or in



most situations the "boot drive" containing the operating system (or it will once you've installed one). This is important as the BIOS will read this drive first by default, meaning it will always be read first, even after resetting CMOS or replacing the BIOS battery. If you don't do this, you can change boot priority within the BIOS, though as mentioned this setting will be lost should you clear CMOS or update your BIOS to a new version.

Once these are installed I'll move on to the power supply. Usually I'll sort cables out before installing, bunching and tying off any unnecessary cables before installation, only leaving required cables free to be routed throughout the case. If you're using a modular PSU, this task is typically easier as you can completely remove any unwanted cables.

Routing at this point is important, as everything should now be installed into the system except for the video card, meaning there will be little room to move and tie off cables after the next step. For this reason, I tie off, reroute and plug in all power cables now.

Once the entire system is connected I'll generally drop in the video cards and other PCI devices, with the only need typically being to connect the PCI power cables. Given the height and length of certain cards, this part could be a little tricky depending on your case choice, and is the reason it's important to tie off other cables before this step.

## Our Build

The reasons we chose our hardware are varied, but essentially we chose what we did because we feel it will last well into the future, and should remain more powerful than even the next generation of consoles (expected some time within the next 24 months).

If you're on a slightly tighter budget than we were with our machine there are a few changes that could be made to save money now, though they may slightly reduce the longevity of the system. For example, our GTX 670 is overkill for the 720P and 1080P of your modern day TV





screen. A GTX 660 would be a more appropriate purchase, or a perhaps a HD7870. We chose the GTX670 mainly to show the length of card the GD05 could fit within it.

Another budgetary change that could easily be made is the SSD could be swapped out for a smaller cache drive. Though to be honest we'd rather see people keep a 240GB SSD in the system, and remove the 1TB or 2TB storage drive to save the money, instead opting to network the system to their primary PC (sharing the drives between them).

Also, if you're so inclined, some pretty cool cases can be found these days, such as the Lian Li T1 mini-ITX which is built with inspiration from a spider (despite only have 4 legs). Cases like this can give any room an Atomic twist, turning a dull HTPC into something of a conversation starter amongst guests.

Of course another (albeit small) saving can be had from sticking to a DVD drive instead of Blu-Ray, or indeed skipping the optical media drive altogether. Depending on your budget you may need to decide on the worth of such a drive yourself, as many people likely don't even own any Blu-Ray media, and in fact may have banished their entire optical media collection to the storage hole years ago.

The final thing to think about, is work out exactly what you want this PC to do, and stick with that. It is very easy to get carried away and add extra hard drives, overpowered video cards and the world's fastest SSD's; but working to a budget is likely the best way to build your own Big Picture box. If you do find yourself needing a hand though, feel free to drop by the Atomic forums where our friendly community, and yours truly will be there to help your decision making process along.

## Getting your games up and running

Big Picture mode is a feature that is still in beta, but Steam users can easily access it by going into the Steam->Settings menu and opting in to the Steam Beta Update on the first Window that appears. After restarting and updating Steam you'll end up with a pretty obvious Big Picture logo in the top right hand side of the Steam application itself.

Hit this and you'll be in the new interface, which is designed predominantly for use with a controller. If you go up to the settings icon in the top right of the screen you'll find an option to enable Steam to boot into big picture mode by default, which you'll want to do if running this PC as a gaming box connected to a TV.

It is also worth going into the other submenus and tweaking both the Voice settings (Remember that push to talk is your friend) and the In-Game ones. The latter of these allows you to bind controls for Steam overlay to buttons on your controller, important if you want to avoid using keyboard and mouse entirely.

The rest of the Big Picture Interface is quite intuitive. You'll find that the menus have been redesigned to make things much easier to find when just using a controller, with the special categories like sale items, coming soon and daily deals hiding under dedicated buttons in the lower row of store icons.

If you check out your library, it is worth filtering the games there. There is actually an option under all games that lets you see which of the titles support controllers (a filtering option not available in the standard Steam interface). This is going to be a subset of the total games you own (in our case out of 306 games 81 supported controllers), but you'll find most AAA titles will have support. When browsing through the store you'll find controller support appearing in the details box for games, and its worth checking before purchasing something with the intent of it running in Big Picture mode.

You'll also likely want to mark games as favourites, or put them in categories so that you can ensure the interface is nice and clean, especially for those with large Steam collections. To launch a game just select it from your library and run it.





## David's Solution

Sometimes it's easiest to just buy a pre-bought system – here's ScorpTec's DragonFly, a great little system for entertainment and gaming.

Scorpion Technology has been building PC systems for years, and its experience in finding the right parts for each of its builds comes through in spades with the DragonFly. Yes, you could easily build this machine yourself for a lot less, but sometimes it's nice to get someone else to do all the work for you – if you've got the money to spare.

The Cooler Master Elite 120 is a great small form factor case, with an elegant front fascia. Nearly every panel on the case features a mesh cut-out or insert, adding the internal airflow of any system built into it. In a machine this small, this is important, as larger fans – like you'll find inside full desktop towers – simply don't fit, so you'll be relying much more on ambient airflow.

Given the solid performance the DragonFly is capable of – very much in range with a much larger machine – heat might be expected to be bit of an issue, but this is where ScorpTec's experience comes into play. When we removed the external cover from the case, we were very pleased with the effort put in to create a clear and open internal space. There's very little in the way of loose cabling; the PSU cables are bundled together and neatly cable-tied to the chassis support members, the SATA cables have been expertly twisted so they take up less space.

Though this system really is perfect for



people who don't want to tinker too much under the hood, this effort yields results in a number of areas. Firstly, it makes achieving airflow through and over hot components that easier, while at the same time helping keep the system free of dust. But it also means there are not a lot of loose parts – this is system that, should you wish it, could easily be moved about the house, and tying down all the cables keeps them nicely out of way. Finally, with everything tied down, there are less parts to pick up vibrations from fans or HDDs, keeping the system very, very quiet in operation – which is essential if you're using this as a media PC next to your TV.

However, with a good mid-range CPU and

## What you get

**Price:** \$1259

**Supplier:** [www.scorptec.com.au](http://www.scorptec.com.au)

**Specs:** Intel Core i5 3470,  
ASUS P8H77-I motherboard,  
8GB Geil RAM,  
120GB Sandisk SSD,  
2TB Seagate Barracuda HDD,  
Cooler Master Elite 120 Mini-ITX case,  
Pioneer DVD-R, GIGABYTE HD7870,  
Antec 520W High Current Gamer PSU,  
Windows 7 Home,  
One year RTB warranty.

8GB of RAM, as well as very good mid-range video card, the DragonFly can easily handle pretty much every day-to-day computing tasks you could throw at it, as well as deliver solid performance should you be looking for a small and portable gaming system.

In our Crysis gaming tests, we found the DragonFly to perform well above its weight, managing to deliver an impressive 39 frames per second even on the game's very demanding Very High settings. Crysis may well be getting a little long in the tooth, but it's still a demanding title, proving the DragonFly very capable in the entertainment stakes. It's a great performer with media, too, though upgrading to a blu-ray drive – not currently on option, sadly – would make a lot of sense. Still, if you mostly consume your media digitally, this is a moot point.

But what makes the DragonFly very attractive is its price. The model supplied to us is only \$1239, with Windows 7 included, and a one year, return to base warranty. You're getting a fair slice of computing power for that price.

And, with such a neat internal build, it's going to be a system that you can easily upgrade yourself for years to come, though for now its specs will suit pretty much every computing task you might want to throw at it. It's a great choice of parts, all from popular and trusted brands, all very well put together a delivering a solid level of performance, in a tiny form factor. If you're looking for a new PC, and one that is built with care, this is an excellent proposition. **DH**





# John's Steam Box

## There's more than one way to skin a cat – or build a loungeroom gaming PC!

I'm actually quite unashamed of having a PC in the lounge room; it has been a pretty constant part of the various share houses I lived in over the past decade. With that in mind though, my days of having a retired full tower take up TV duties are over. Ever since I first saw Bitfenix' prototype of its Mini-ITX Prodigy case I have known that it was the perfect 'Mini-PC' to hook up to my TV.

For this my needs are fairly well defined. I'm after a system capable of gaming at the 1080p native resolution of my TV, surround sound output for the home theatre speakers and the ability to remotely control the whole setup via my Nexus 7 tablet.

Pricing is a concern, but I also want a few features for experimenting with in the future. The main one of these is WiDi support – while the system itself will be networked with a cable, the ability to leverage Intel's Wireless Display technology makes for more flexibility when it comes to rearranging the lounge room.

These needs mean choosing a decent Mini-ITX motherboard to act as the heart of the system. While my heart was initially set on ASUS' wondrous P8Z77-I Deluxe board, I ended up going with Gigabyte's GA-Z77N-WIFI board, which had the features I need, but at a pricetag almost half that of the ASUS offering.

The kind of games played on my TV are largely console ports, with the occasional indie platformer and the like. With that in mind I went for a Core i3 2220 – the lowest end Core processor from Intel. This was paired with a Kingston 8GB value ram kit, which has two 4GB sticks. This is one of the cheapest sets of its kind out there, but it is a brand I trust and for the kind of usage model I plan

for the system, a high performance memory kit would be overkill.

Video card was a tough choice. I ended up settling on a GeForce GTX 660 Ti, still probably more than I needed but with enough headroom to ensure smooth, fast gameplay. It costs a little more than a similarly competent AMD card, like a HD 7870, but *Borderlands 2* has convinced me that I want hardware PhysX support for those games that have it.

I run a Synology NAS on my home network, which covers most of the bulk storage needs, but even though I am a massive fan of Symbiotic Links to far away directories, I feel uneasy about relying on a network connection to my Steam folder. With this in mind I ended up going with a modest 120GB SSD, paired with a 2TB hard drive. The choice of 2TB was purely down to it being the current sweet spot in drive pricing, barely more than a 1TB but significantly cheaper than a 3TB one. It is more than enough capacity to maintain a healthy collection of installed games on the PC itself, while still leaving room for any crazy future ideas I have.

The remaining parts of the system were made up of an Antec Earthwatts 650 PSU – it has captive cabling, which isn't ideal, but they can be hidden away. The efficiency is nice, and the power draw on the PSU should be just right. I also ended up going with the stock Intel cooler for the CPU, although I do plan on adding a closed loop water cooler at some point in the future, just because I can.

I decided against using an Optical drive after seeing the thick layer of dust formed on my



PlayStation 3. It was still there in the rare case that I wanted to watch a Blu-Ray, and shoving a drive into the PC would have been a bit indulgent.

For interfacing I went with Microsoft's Wireless Xbox controller for Windows (I could have used a PS3 controller connected via Bluetooth but the reality is that the Xbox controller is the most compatible solution with Windows games). I have a wireless media keyboard/trackball combo that comes in handy but most of the control is done via Android apps on my tablet, or the Xbox controller for Steam when set to Big Picture Mode.

As for operating system, I actually bit the bullet and went with Windows 8 for a variety of reasons. The first was that the \$40 upgrade price meant that I could finally make use of the copy of Windows Vista Ultimate that I had kicking around. I also find that the live tile interface isn't too bad when used on a TV (it is certainly better than on the desktop). Also a factor is the fact that until January Microsoft is giving away the Windows 8 Media Centre add-on for free, which covered any future development of the concept as a DVR, and the final bit was a growing fascination with the Windows 8 version of Xbox Music, which turns the system into a streaming music jukebox for very little extra cash. ( (c) JG





# KITLOG

These are four of our basic systems, with something for every taste. **The Game Box** is put together with money-saving in mind, but also an eye to getting as much bang for buck. Our build may be a little more expensive than what you could technically get away with, but for that extra few hundred you're also getting cutting edge performance and one of the most overclockable chips you can get today.

We had been considering whether or not NVIDIA's new GTX 660 deserves a place in the KitLog this issue; some of the new models are pretty damn fantastic. However, we're leaving it for now, because at launch, it's just a touch too expensive to justify a purchase. We're leaving the KitLog unchained for now, but if the price of the 660 drops at all... game on.

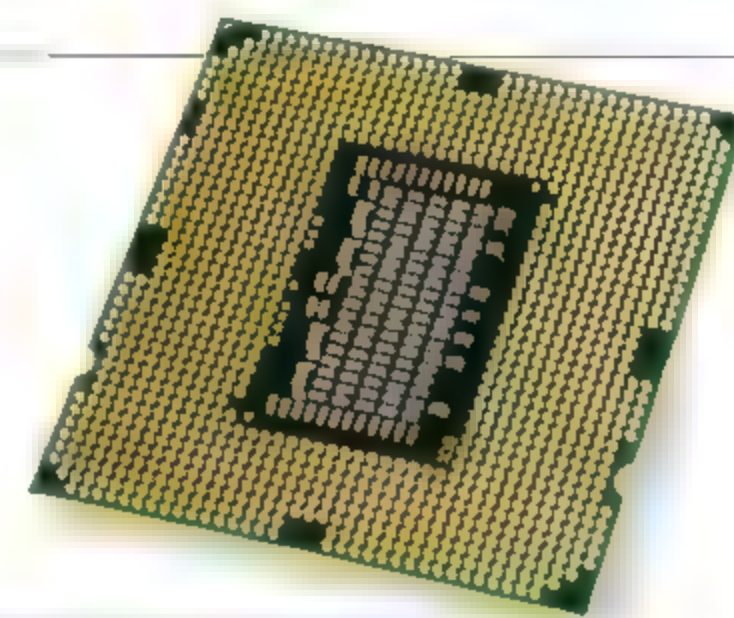


**The Perfect PC**, on the other hand, is the system everyone aspires to, with nothing but the best parts – without going crazy, though. It's a collection of all the greatest hardware that we'd pick without a budget, sure to impress with performance and sheer style.

Oh, and if you're wondering what the Ref IDs are, that's the ID of that article on our website. Just enter it like this – [www.atomicmpc.com.au/?NUMBER](http://www.atomicmpc.com.au/?NUMBER) – and you'll go straight to that review.

## THE GAME BOX

CPU



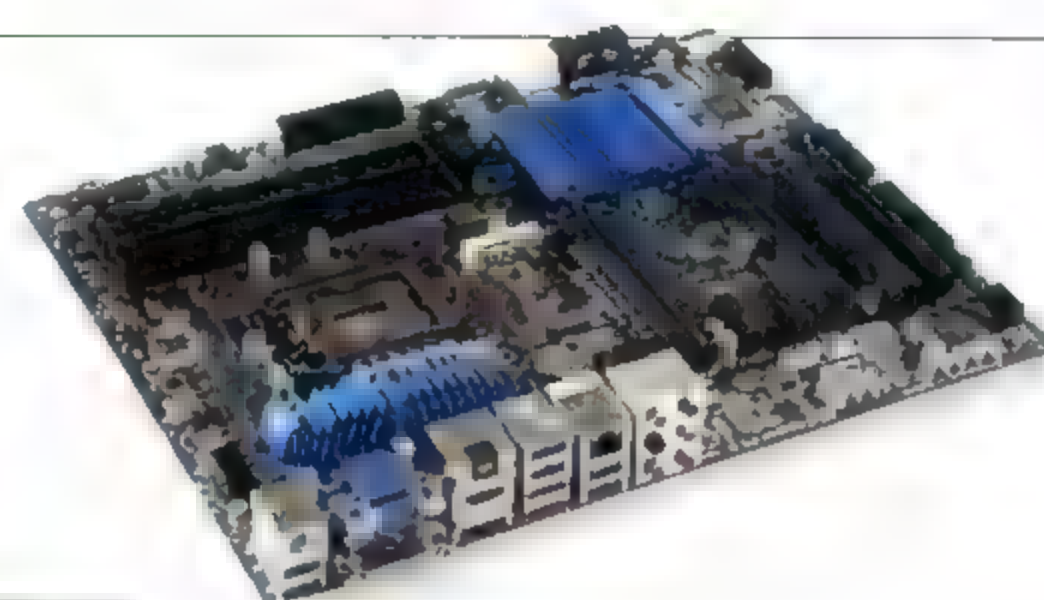
**Intel Core i5 3570K**  
PRICE \$245

Remove the Hyper Threading, and save \$150? DEAL!

MOTHERBOARD

**Gigabyte Z77X-UD3H**  
PRICE \$185

Affordable gaming performance and features.  
*Issue 187, Page 57*



MEMORY



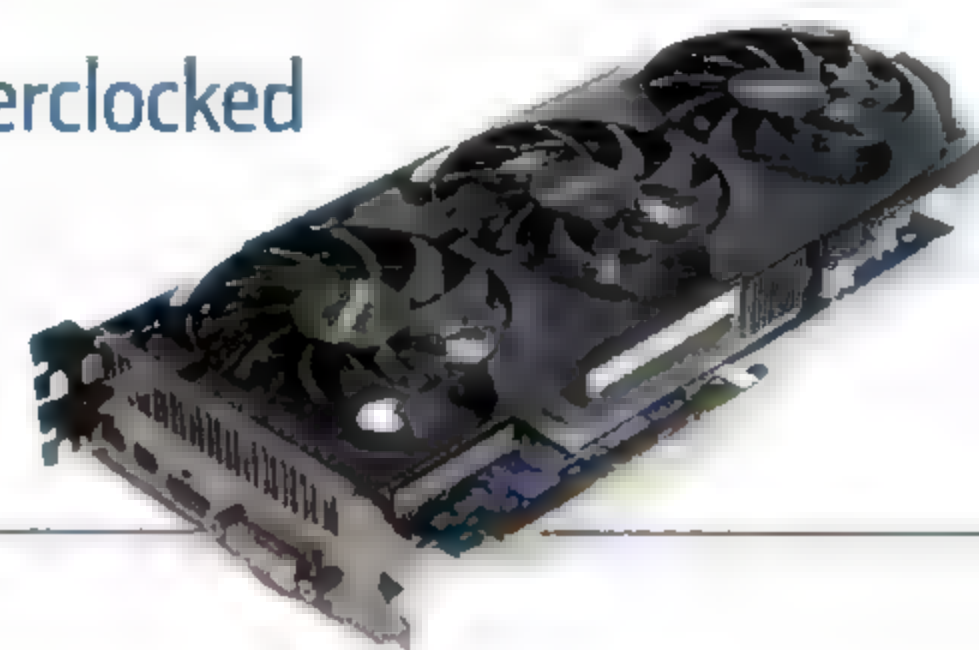
**G.Skill Ripjaws F3-12800CL9D-8GBXL**  
PRICE \$55

Great value, decent performance, and some flexibility.

VIDEOCARD

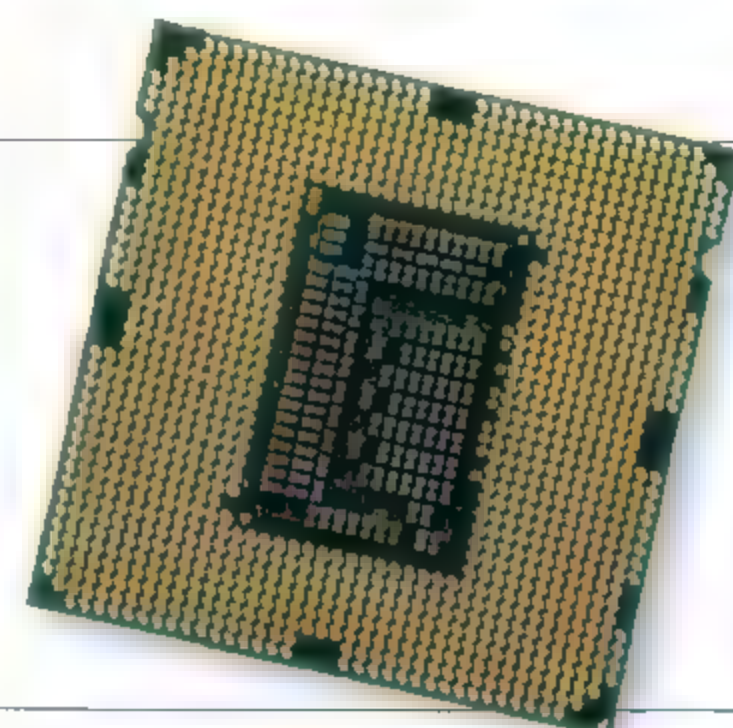
**GIGABYTE HD7870 Overclocked**  
PRICE \$260

Performance close to the 7950, with a price tag no where near.



## THE PERFECT PC

CPU



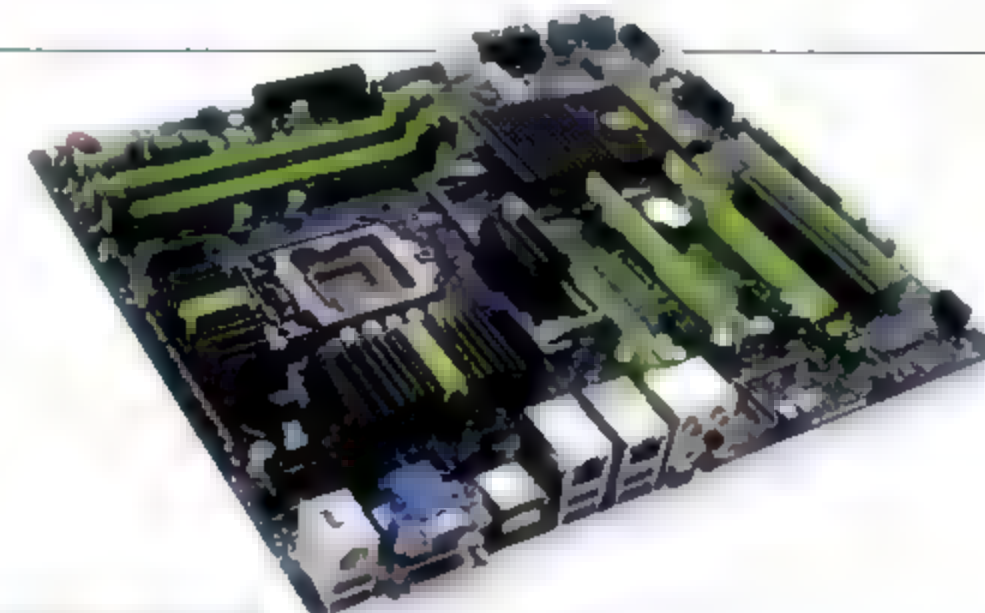
**Intel Core i7 3770K**  
PRICE \$350

8 Threads of Ivy Bridge efficiency, Overclock for justice!  
*Issue 137, Page 40*

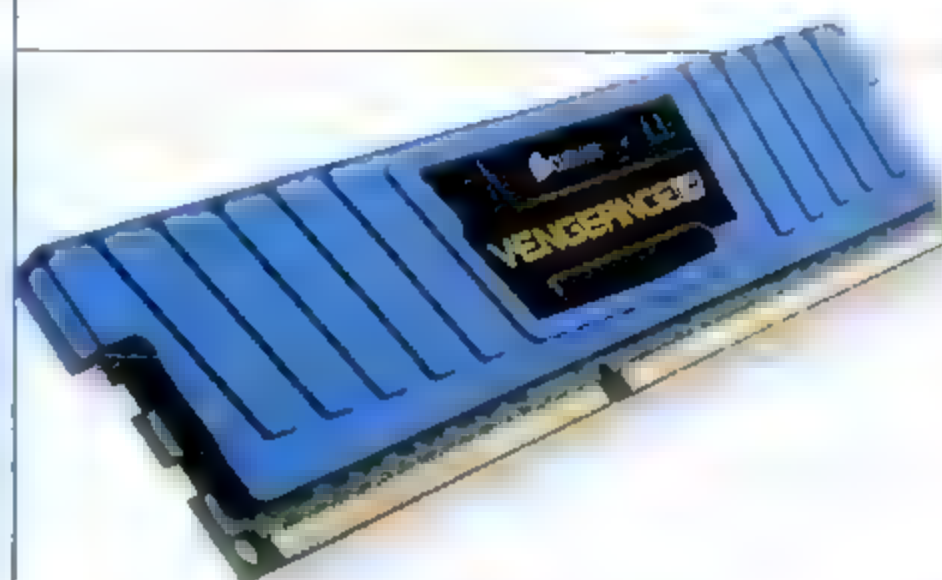
MOTHERBOARD

**Gigabyte G1 Sniper 3**  
PRICE \$380

It's about as super-premium as you could get, or want.  
*Issue 138, Page 40*



MEMORY



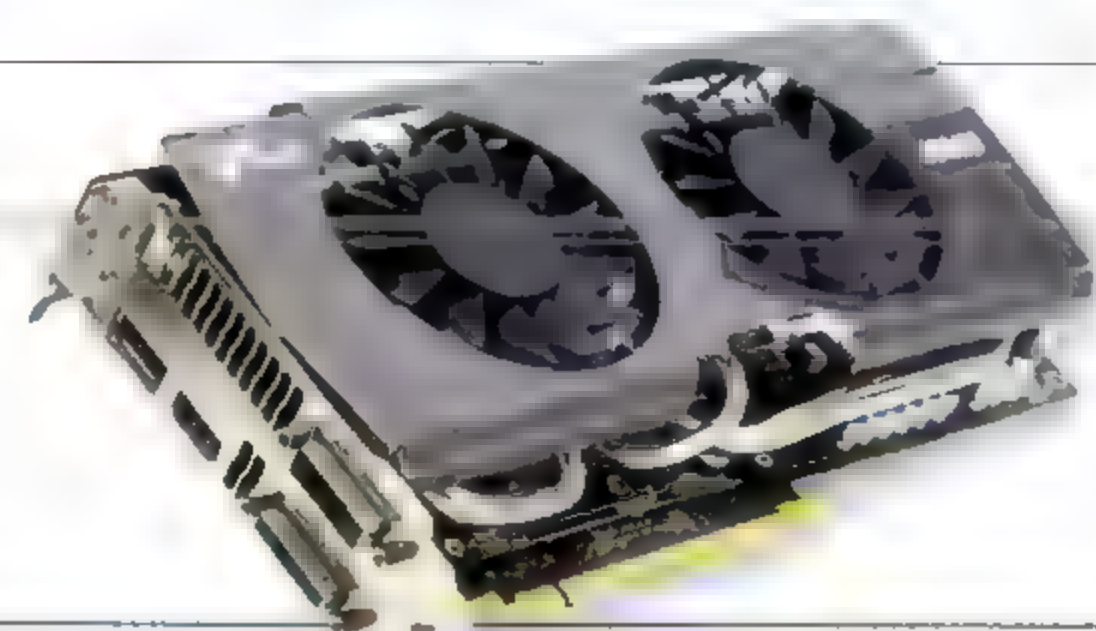
**Corsair Vengeance Low Profile CML16GX3M4A1600C9B**  
PRICE \$120

16GB of fast memory. Virtualise everything!

VIDEOCARD

**MSI GTX 680 Twin Frozr OC SLI**  
PRICE \$1180

Great value, overclocks extremely well, super fast.

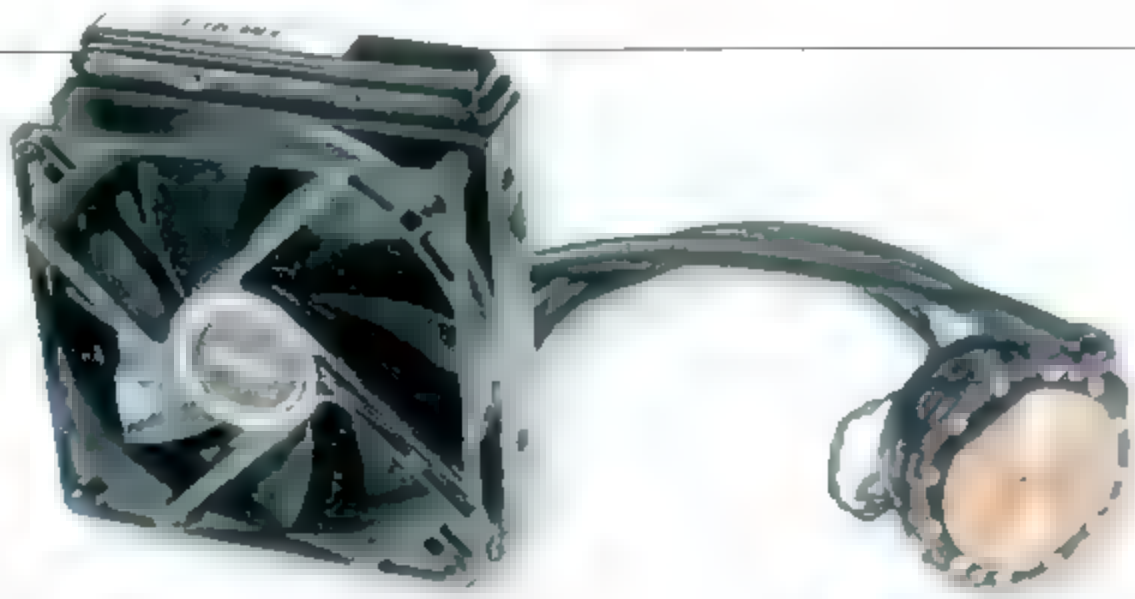




SUBTOTAL: \$1675

RIG ONLY: \$1065

COOLER

**Antec Kuhler 620**

PRICE \$85

Water cooling is the future, today!

CASE

**Bitfenix Shinobi**

PRICE \$80

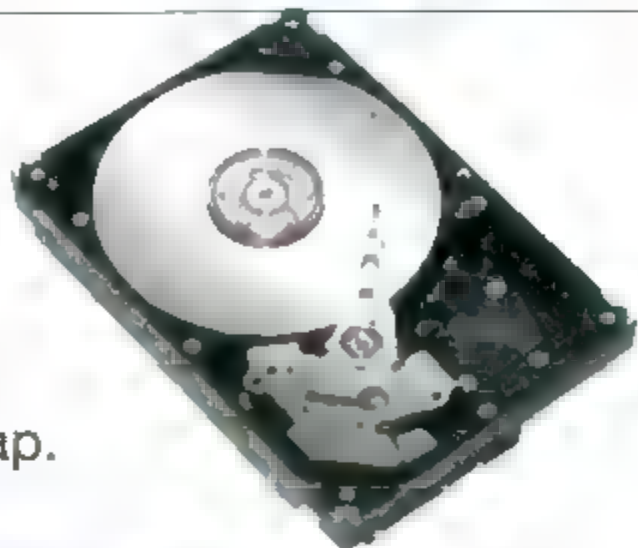
Worth it for the price alone, and sexy to boot.  
*Ref ID: 260177*

SYSTEMDRIVES

**2TB HDD**

PRICE \$90

Two thousand gigabyte storage drive on the cheap.

**Pioneer DVR-219L**

PRICE \$35

Discs. You needs 'em.

KEYBOARD

**Razer Arctosa**

PRICE \$50

A cool-looking keyboard that'll serve you very well.  
*Ref ID: 149483*

DISPLAY

**LG IPS277L**

PRICE \$400

**NEW**

27 Inches of IPS glory. The resolution isn't perfect, but the price is.

MOUSE

**Corsair Vengeance M60**

PRICE 70

Exceptional mousing value.  
*Issue 134, Page 49*

AUDIO

**Plantronics Gamecom 780**

PRICE \$90

Solid set of cans with great audio.  
*Issue 138, Page 43***Onboard Realtek ALC889A**

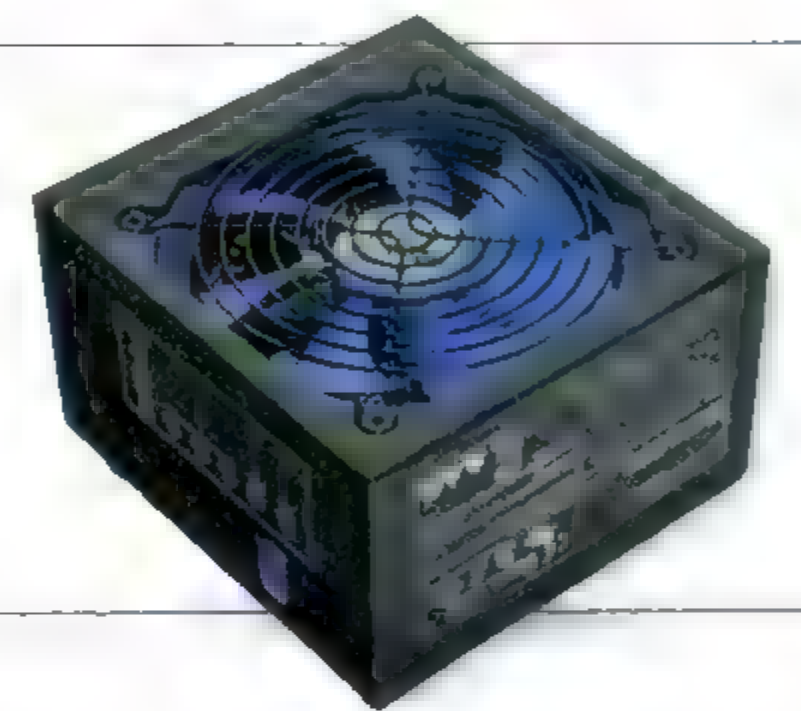
A decent chip that does the job.

POWER SUPPLY

**Silverstone Strider 500W**

PRICE \$65

A solid PSU, capable of powering much more.



SUBTOTAL: \$4915

RIG ONLY: \$3750

COOLER

**Corsair H100 Water Cooler**

PRICE \$160

Fits perfectly in th Cosmos S II, mounting directly on the roof.

CASE

**Cooler Master Cosmos II**

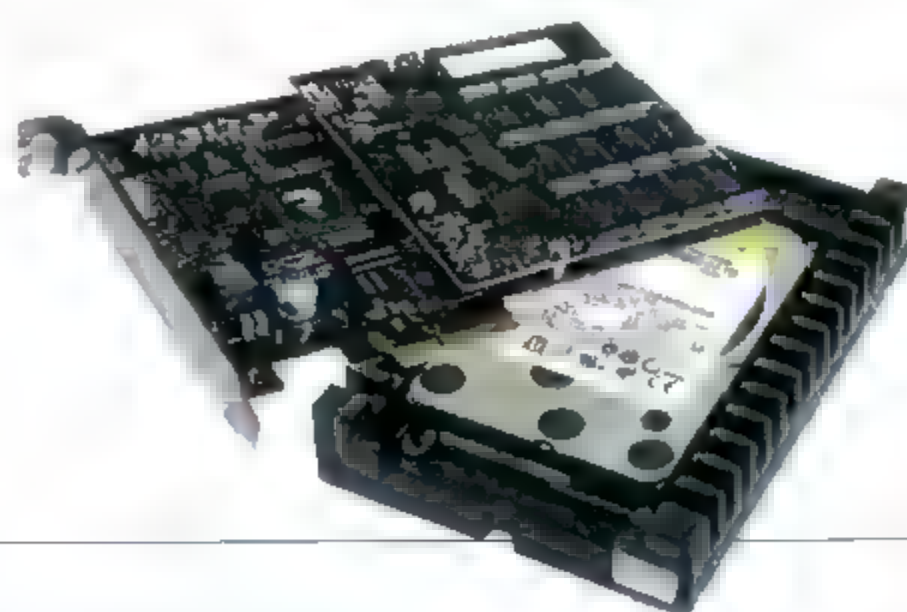
PRICE \$400

The only case you'll ever need. Premium luxurious bliss.  
*Ref ID: 290959*

SYSTEMDRIVES

**OCZ REvo Drive 3x2 & WD 1TB VelociRaptor**

PRICE \$490 + \$350

Superfast SSD and zippy storage.  
*WD: Ref ID: 220323*

KEYBOARD

**Razer BlackWidow Ultimate**

PRICE \$160

The new benchmark in gaming quality.  
*Ref ID: 251095*

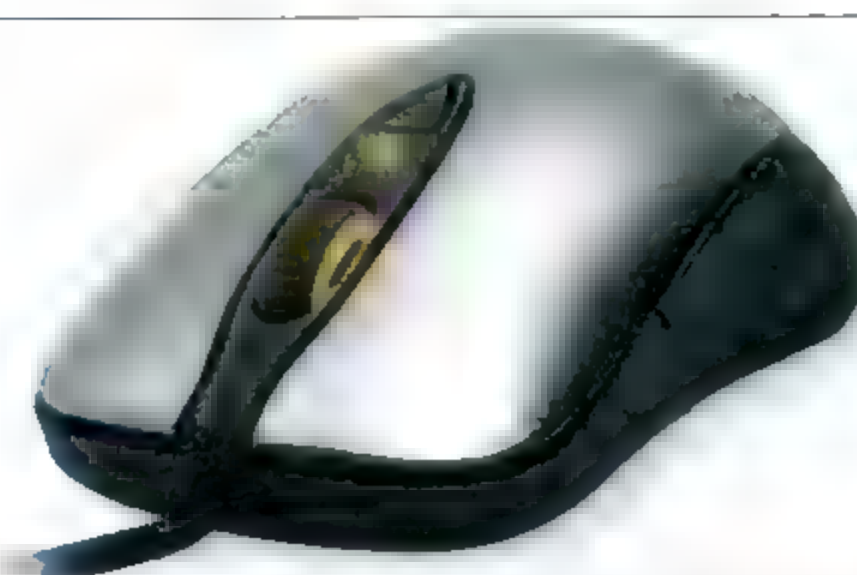
DISPLAY

**ASUS PB278Q**

PRICE \$690

One of the best 27" monitors on the market.

MOUSE

**SteelSeries Sensei**

PRICE \$115

The best-performing mouse we've used to date!  
*Ref ID: 276668*

AUDIO

**Shure SRH-840**

PRICE \$200

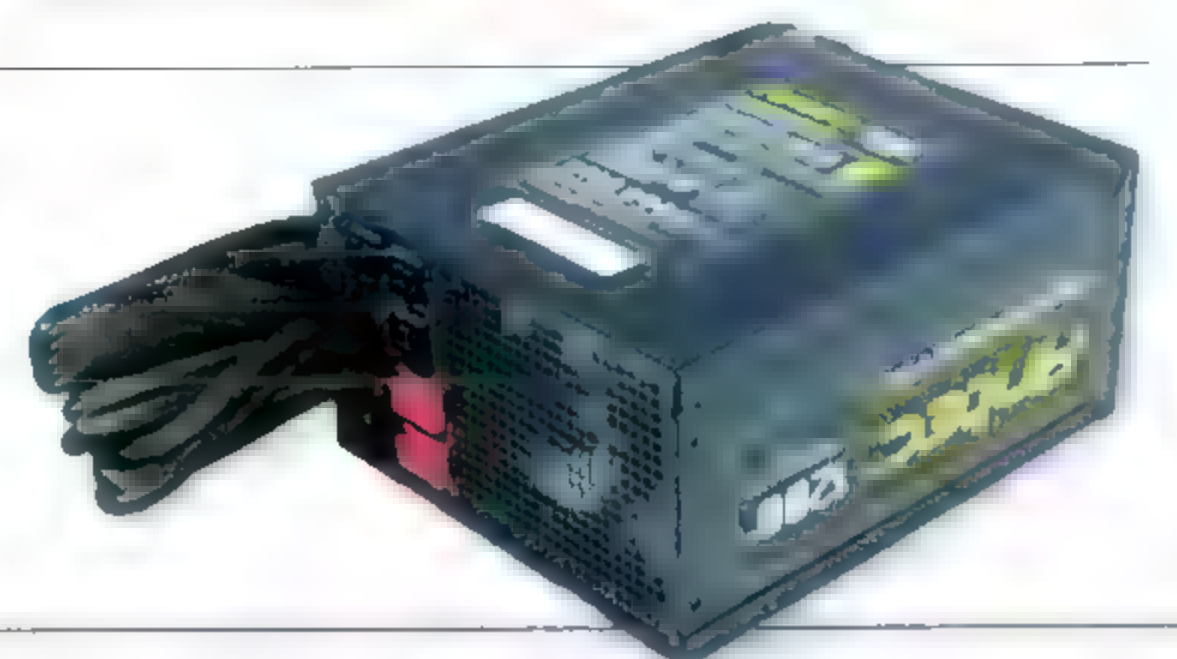
The best value closed-ear studio headphones around



POWER SUPPLY

**Antec HCP 1200W**

PRICE \$320

Plug in a graphics card. Or four. The HCP won't care.  
*Ref ID: 272588*



The **LAN Rig**, the ultimate in portable gaming power – go anywhere, frag anyone. No longer will you be tied to a desk or forced to awkwardly manhandle your full-sized rig, helped by a convenient handle and beefy tech. Perfect for wowing people at LANs, the tech inside is fast enough to run any game, and boasts enough speed to keep your game running at full clip even if other programs intrude in the background. After all, no-one wants to miss a headshot.

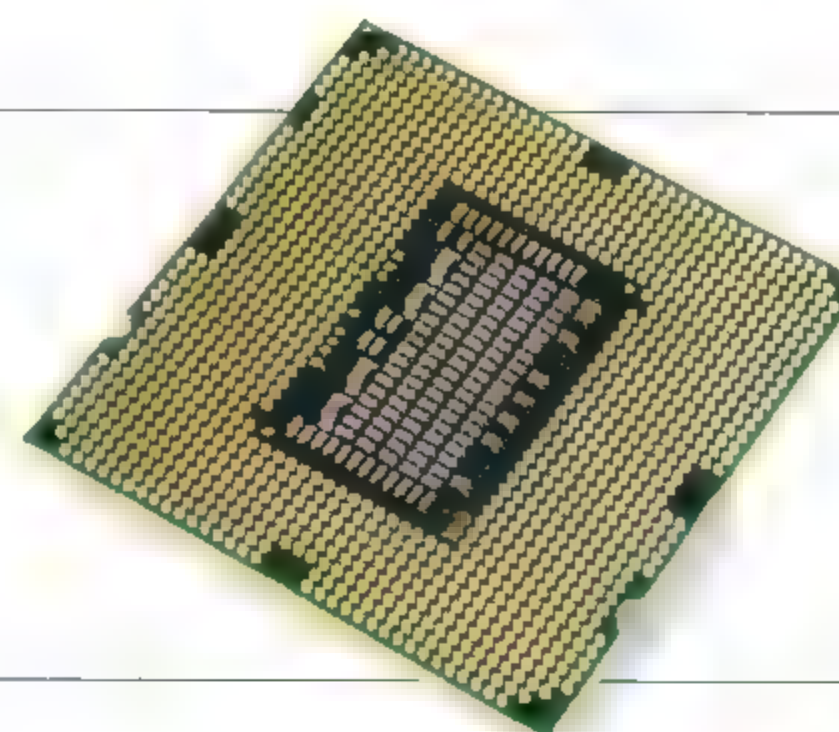
There are times when a soundcard can't cut it for your audio desires, where your 600ohm headphones feel underpowered and you need more OOMPH. Thankfully there's a market to cater for you, and multiple Digital-Analogue-Converter/Amplifier hybrids are on the market, such as the ASUS Essence One or Matrix Mini-I. They give much better audio quality, and the punch needed to enjoy music to its fullest. Only serious enthusiasts need apply.



Finally, for the more entertainment-minded – and really, that's all of us – there's **The Mini**, ready to play movies and music quietly and efficiently. The basic guts are fast enough for general tasks, and the IGP can handle High-Definition content. You can also choose from three entirely optional upgrades to suit your needs best: a graphics card for WoW, TV tuner to catch the game, or a Wireless card to sync without cables. The perfect energy-conscious build.

## THE LAN RIG

CPU



**Intel Core i5 3470**

PRICE \$190

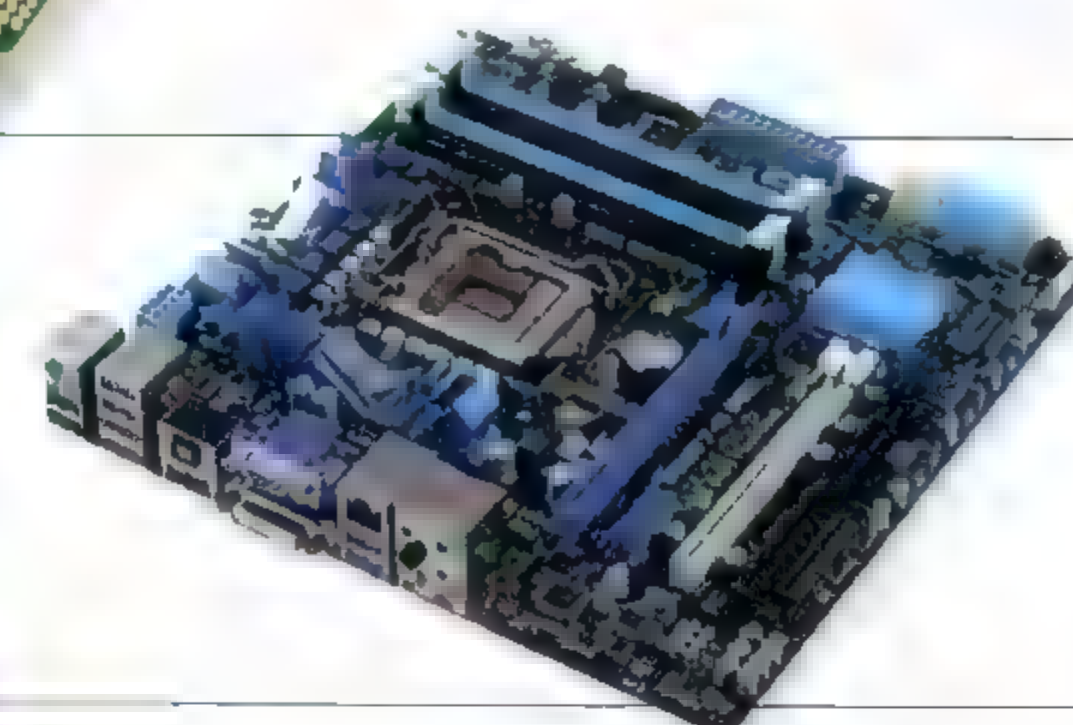
The best value Ivy Bridge quad-core, overclocking limited.

MOTHERBOARD

**Asus P8Z77-M**

PRICE \$115

A mATX board with everything you need.



MEMORY



**G.Skill Ripjaws F3-12800CL9D-8GBXL**

PRICE \$55

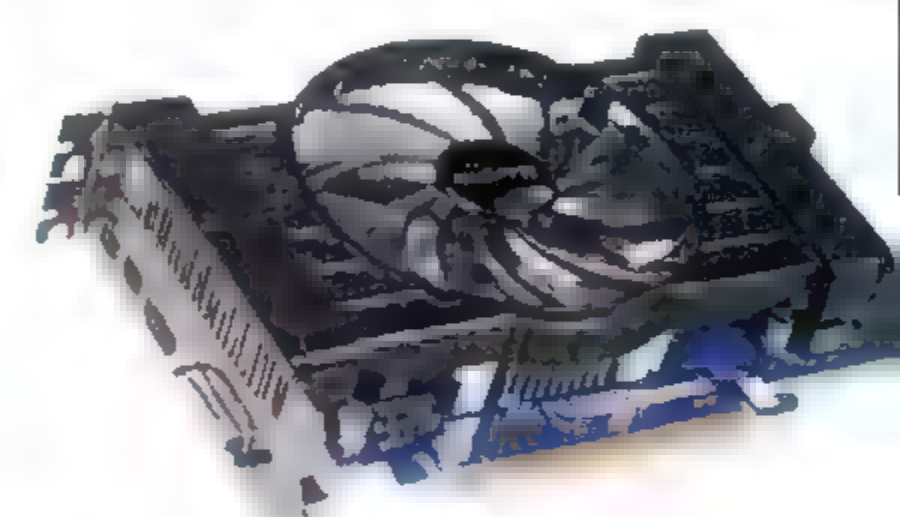
Great value, decent performance, and some flexibility.

VIDEOCARD

**GIGABYTE HD7770 Overclocked**

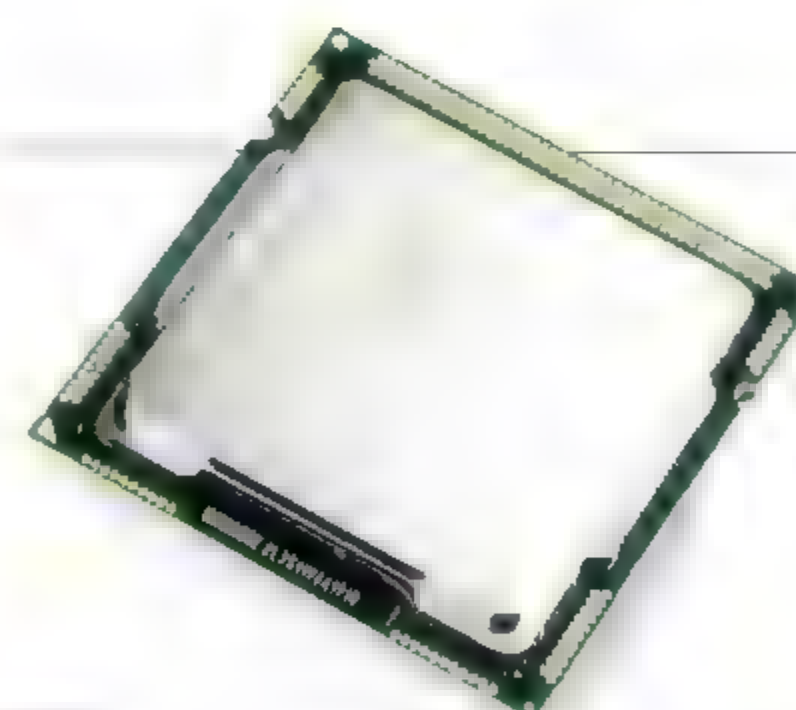
PRICE \$130

Keeping your LAN box cool and powerful.



## THE MINI

CPU



**Intel Core i3 3220**

PRICE \$130

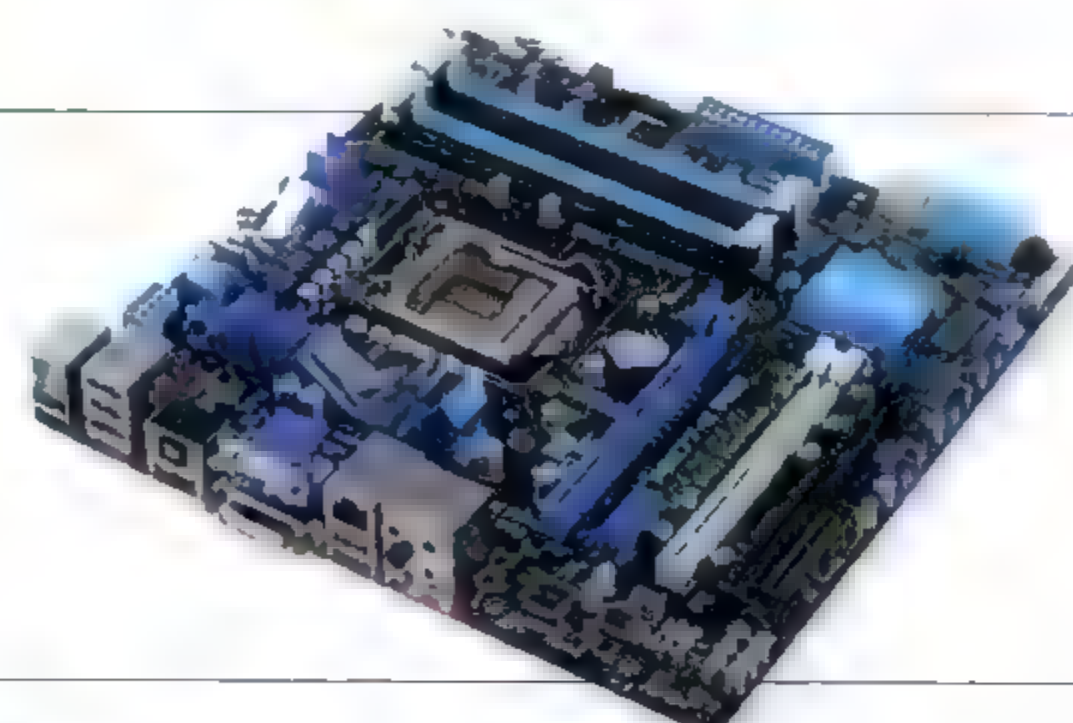
Super low-heat dual-core processor with IGP.

MOTHERBOARD

**Asus P8Z77-M**

PRICE \$115

A mATX board with plenty of upgrade options.



MEMORY



**Corsair XMS3 CMX4GX3M2A1600C9**

PRICE \$35

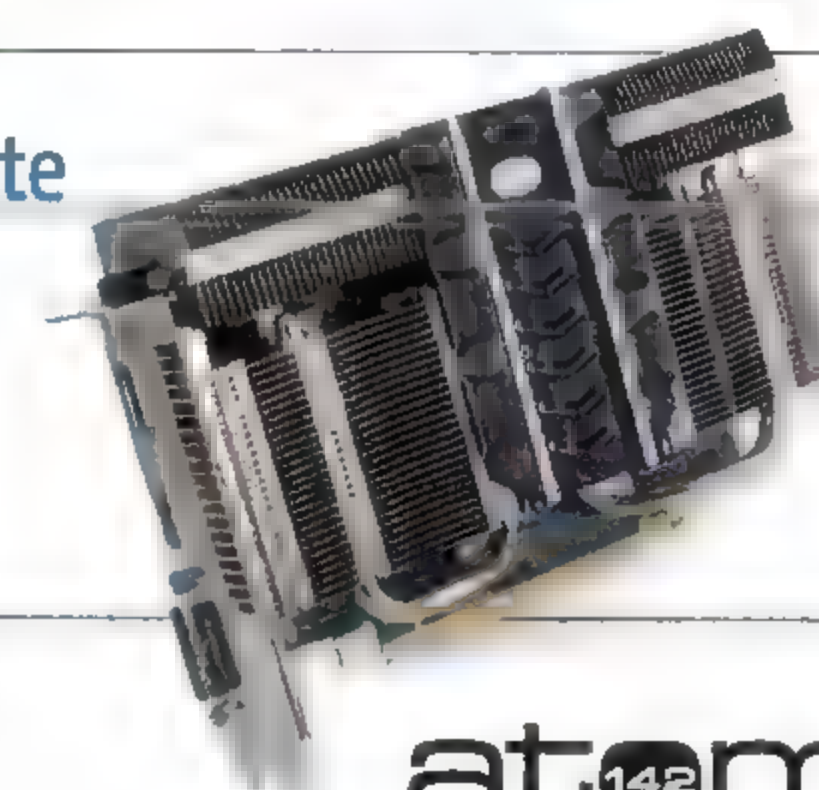
4GB of fast memory is plenty for running multiple HTPC media streaming apps.

VIDEOCARD

**Sapphire HD7750 Ultimate**

PRICE \$130

Enough to play games on, and adds outputs without extra noise.

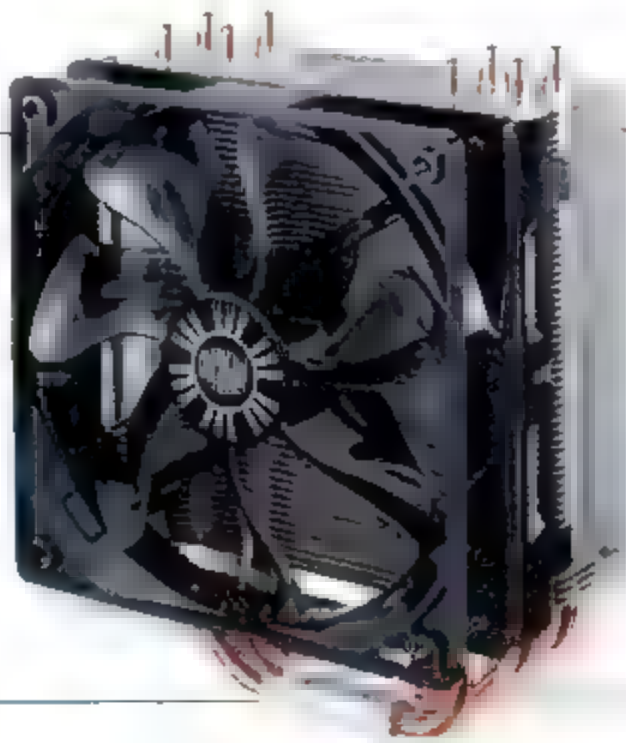




SUBTOTAL: \$1160

RIG ONLY: \$760

COOLER



### Cooler Master 212+ Evo

PRICE \$40

It's all about cost and weight efficiency when traveling.

CASE



### BitFenix Merc Alpha

PRICE \$50

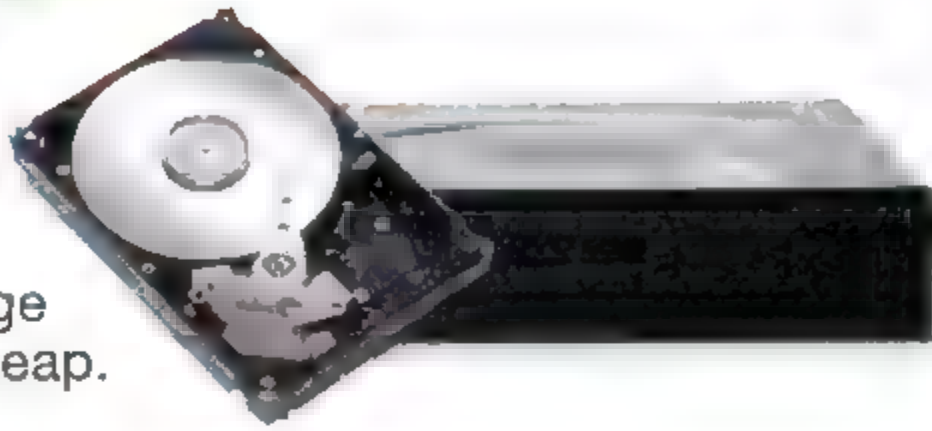
Small case with great potential, it's got it where it counts.

SYSTEMDRIVES

### 2TB HDD

PRICE \$90

Two thousand gigabyte storage drive on the cheap.



### Pioneer DVR-219L

PRICE \$35

Discs. You needs 'em.

KEYBOARD

### Razer Arctosa

PRICE \$50

A cool-looking keyboard that'll serve you very well.  
*Ref ID: 149483*

DISPLAY



### NEW LG IPS23V

PRICE \$180

22 inches of value-packed screen, great buy.

MOUSE



### Corsair Vengeance M60

PRICE \$70

Exceptional mousing value.  
*Issue 134, Page 49*

AUDIO

### Plantronics Gamecom 780

PRICE \$90

Solid set of cans with great audio.  
*Issue 138, Page 43*

### Onboard Realtek ALC887

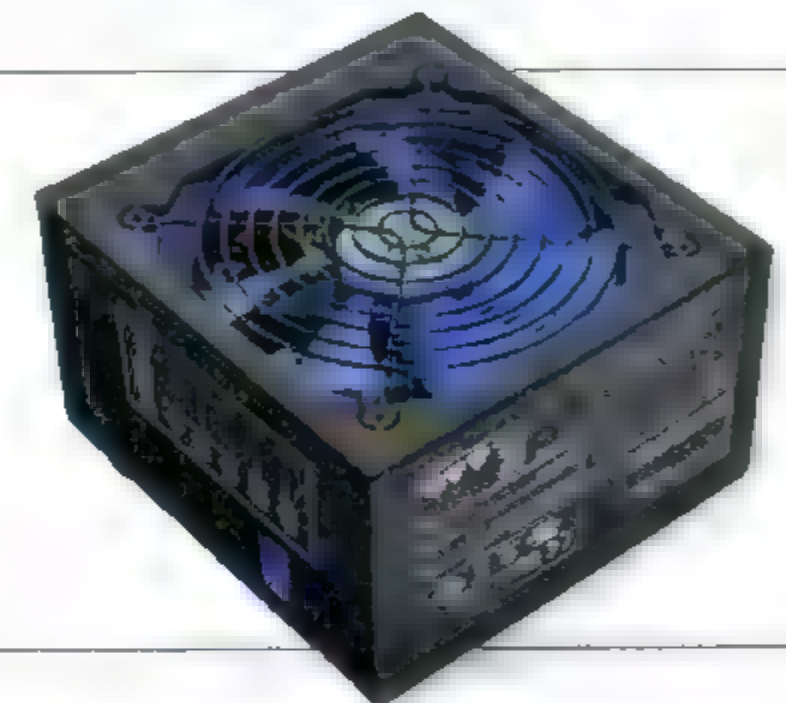
A decent chip that does the job.

POWER SUPPLY

### Silverstone Strider 500W

PRICE \$65

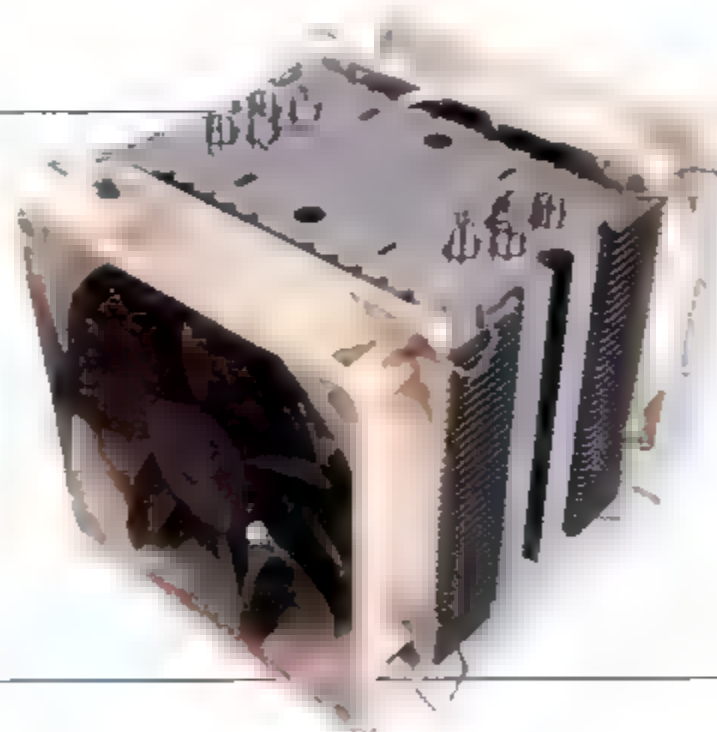
A solid PSU, capable of powering much more.



SUBTOTAL: \$1465

RIG (NO OPTIONS): \$1195

COOLER



### Noctua NH-U9B SE2

PRICE \$65

Plenty of cooling, and quietness to boot.

CASE



### Silverstone Fortress FT03

PRICE \$190

The best HTPC case we've seen yet, with space for plenty o' bits.

SYSTEMDRIVE

### 2TB HDD

PRICE \$90

Buy three of these for super-crazy storage capacity.



COOLING

### Scythe SFF21D

PRICE \$30 x 3

Replace the stock fans and hear the computer no more.



OPTIONAL

OPTICAL



### Silverstone SOD02B

PRICE \$80

Slot-loading DVD drive for movies, installs or backups.

KEYBOARD



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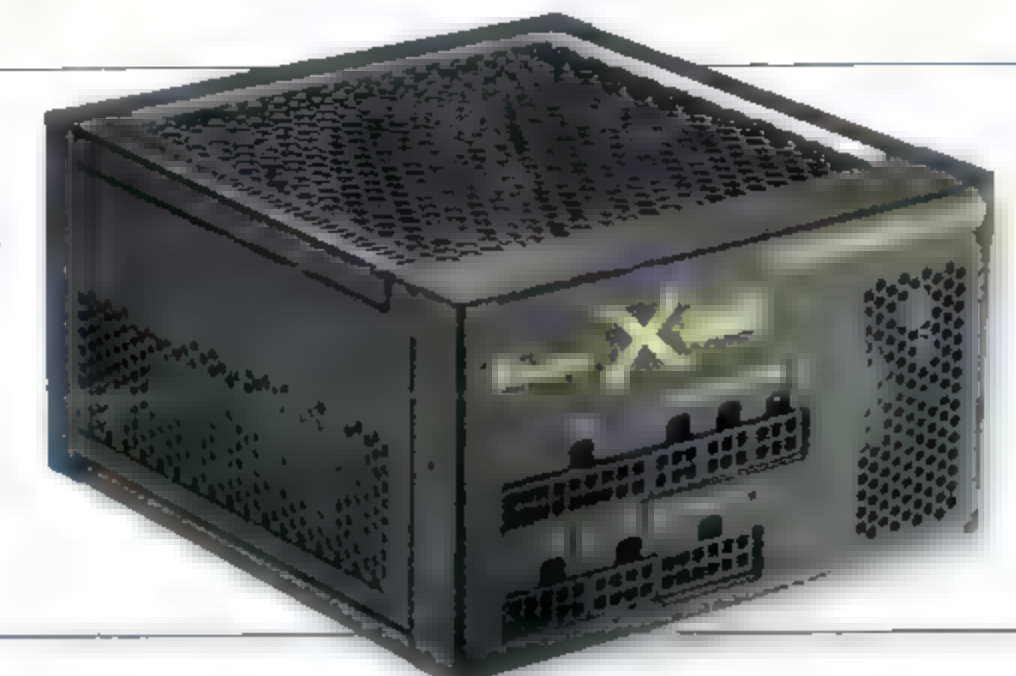
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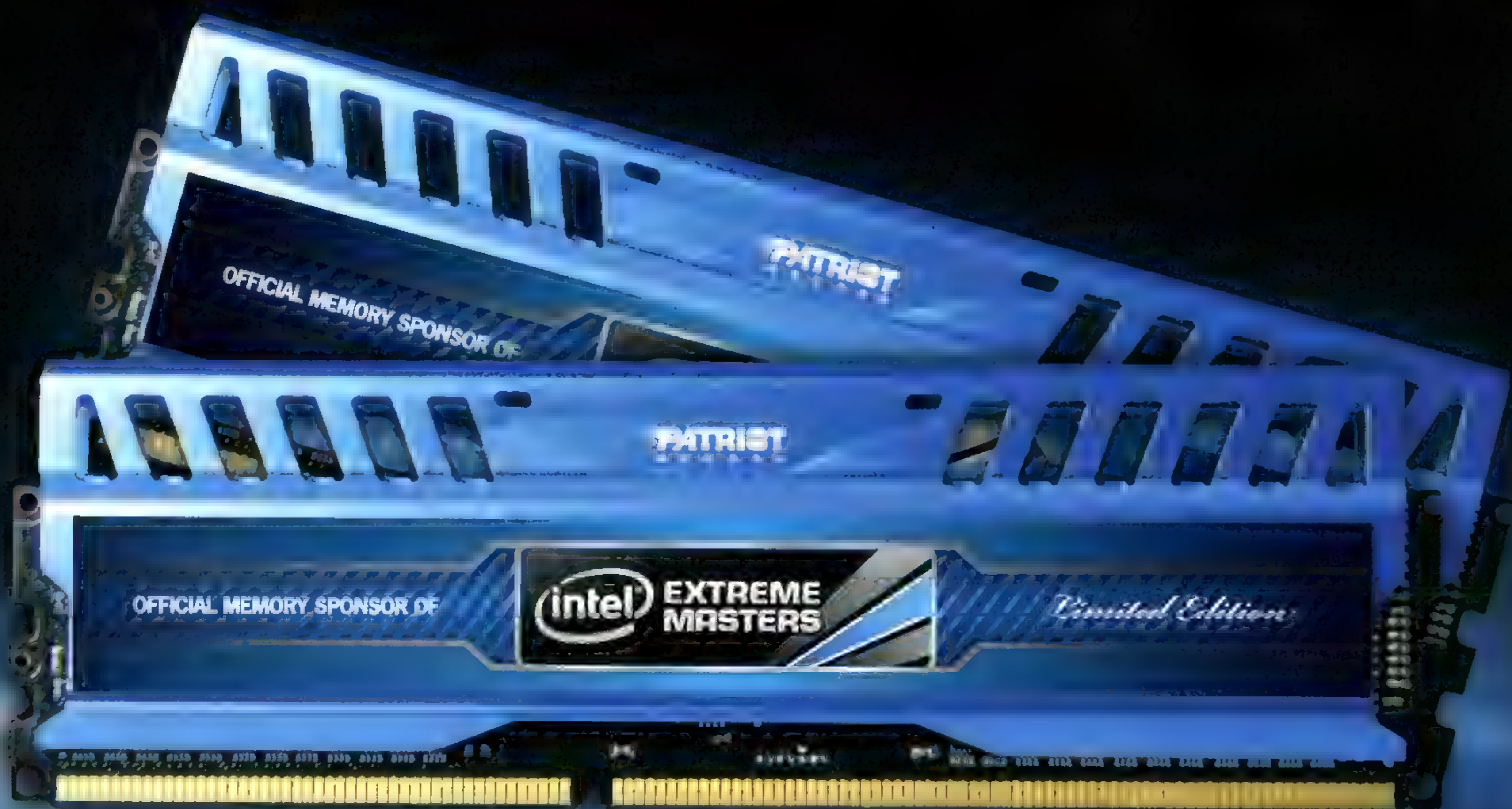


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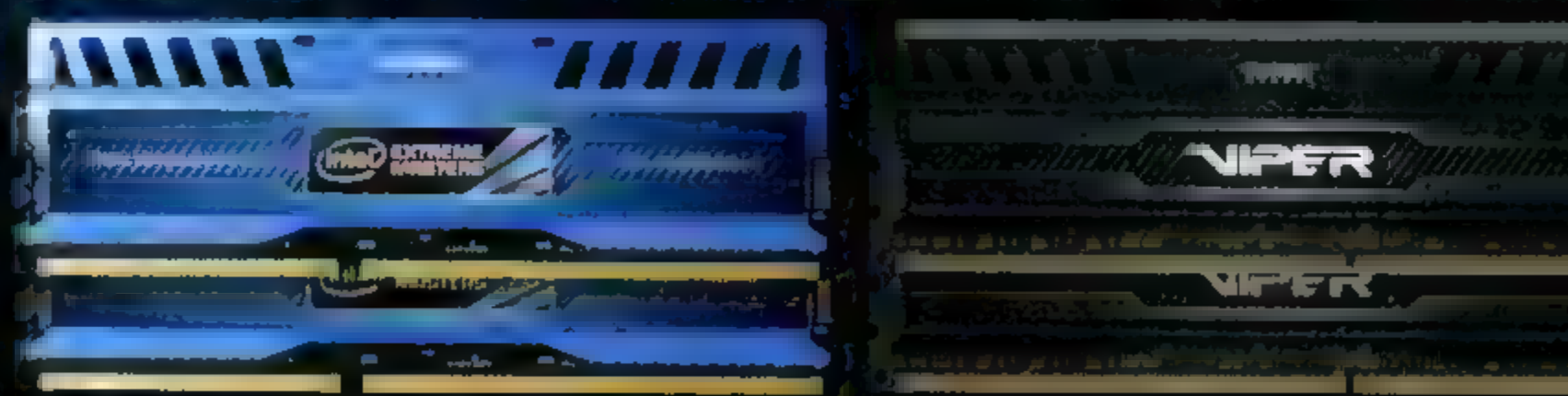


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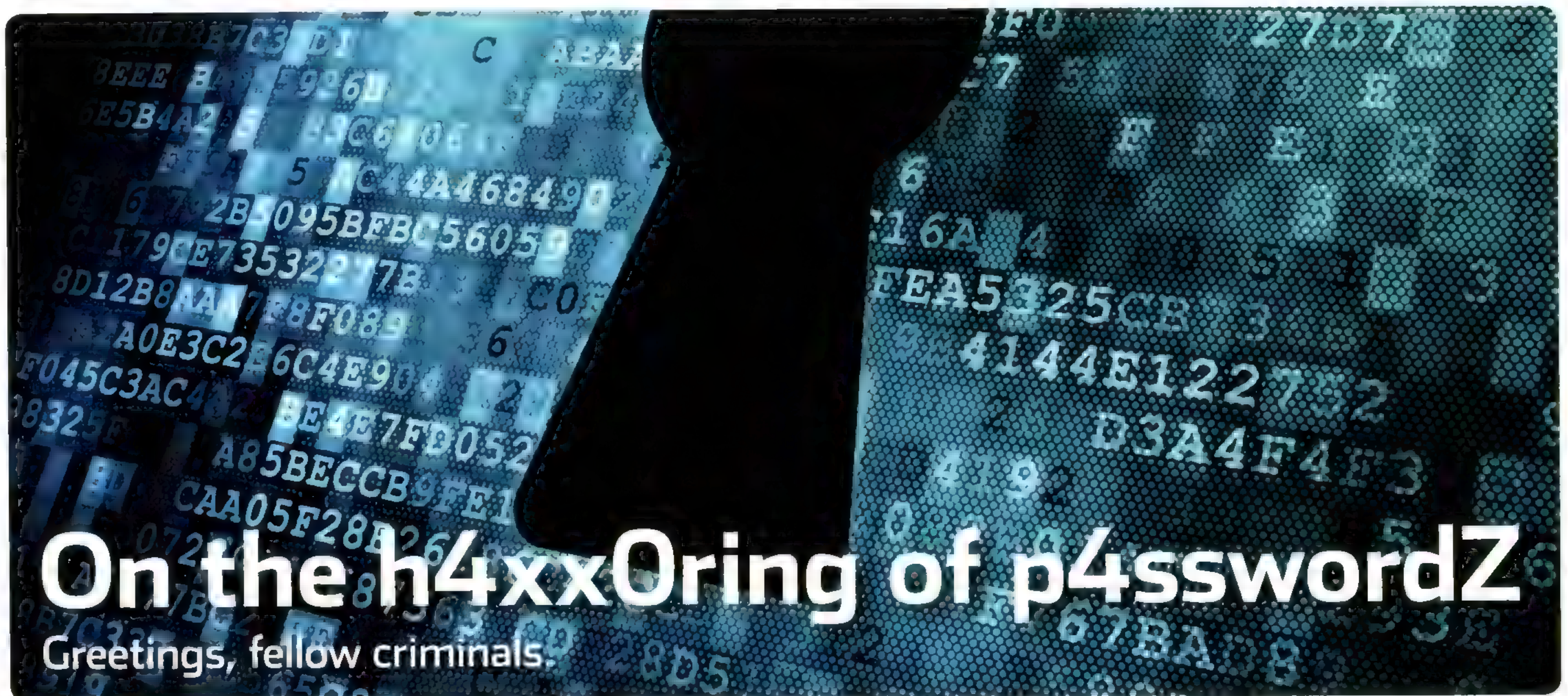


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# On the h4xx0ring of p4sswordZ

Greetings, fellow criminals.

**T**oday, I will be discussing recent happy developments in the profitable and entertaining field of stealing other people's Internet passwords.

This used to be quite annoying. Every now and then some idiot would leave ftp.idiot.com/secret/passwords.txt just sitting there in plaintext, not the salted password hashes that they should have saved. But usually it wasn't easy to get the hashed passwords, and then it was unacceptably computationally expensive for us to brute-force our way through passwords of ever-increasing length until we found some that matched the hashes.

We could avoid this by doing dictionary attacks, including real words and common combinations, to find the people who thought

as a username. They also tend to use the same password for multiple sites. So when the whole Gawker network leaves a huge pile of hashed login data where one of us can find it, or when RockYou.com lets loose a giant pile of plaintext passwords, it's try-'em-everywhere time!

If a user only uses duplicate logins on unimportant sites, then it's not much use to us. Cracking someone's accounts on IMDB and The Pirate Bay and BrickSet only let you give every Rob Schneider movie ten stars, leave adulatory comments on the pages for torrents of Belgian cuttlefish prOn, and say you really wish Lego would bring back Fabuland. If a given person's login to comment on a crocheting blog is the same as their login for PayPal, though, we're in business!

jamesbond007 should take "37 years" to crack. Passwordmeter.com says it's "Good". Testyourpassword.com and Microsoft's checker at bit.ly/mspwcheck both say it's "Medium". As does testyourpassword.com, which actually has a "Common password!" warning feature, but jamesbond007 doesn't trip it.

Nonsense words like "pingoflorbleninces", and multi-word passphrases like "speaker cup cable junction" or the famous xkcd "correct horse battery staple", are pretty easy to remember and use, and near-impossible to crack. But, to a first approximation, nobody uses them. So we don't have to worry.

We're like burglars passing over the place with the window-bars and alarm stickers and kicking through the fibro next to the security door of the house down the road. As long as

**What's really great, though, is how much both users and operators of passworded web sites help us out.**

"passw0rd1" or "jamesbond007" were good enough. But many passwords were still too complicated, and pure brute-force attacks are too slow.

Then affordable computers with gigabytes of RAM and fast CPUs came along, allowing the creation of "rainbow tables". A rainbow table provides the effect of reversing the hash of every possible password of a given length, without requiring impossible amounts of storage space.

You don't need rainbow tables for short passwords any more, though. Faster CPUs and reprogrammable graphics cards have helped us a lot in this area, especially if we have a botnet to help us.

What's really great, though, is how much both users and operators of passworded Web sites help us out.

Users often have to use their e-mail address

The big password leaks are great for us in another way: They let us see the kinds of passwords that people use. Huge swathes of the brute-force password space can now be left to the very end of the cracking process. We've now got giant dictionaries of actual passwords, and heuristics to mutate them into other likely candidates, to use before slow brute force. If you're happy with cracking only a quarter of the accounts you attack, you can now get it done before your laptop battery goes flat!

I'd especially like to congratulate those among us who, clearly, are responsible for online "password strength tester" sites. Your average schmuck thinks those sites may actually save the passwords for later misuse, but their real purpose is of course to give good ratings to terrible passwords like "jamesbond007".

Howsecureismypassword.net says

Lambo?

[dan@atomicmpc.com.au](mailto:dan@atomicmpc.com.au)





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: (





## Important news for Atomic readers & subscribers

The issue of Atomic you are holding in your hands ...will be the last standalone issue of the magazine published by Haymarket Media.

It's sad news, but don't be too sad – this magazine may be gone, but Atomic is changing shape, evolving into something very exciting.

Starting from the first issue of PC & Tech Authority next year, the two magazines will be merging, and our subscribers are on the inside track to this amazing combination of titles. Your Atomic sub will switch over automatically to the new, bigger and better PC & Tech Authority.

The February issue will be bigger than ever, with a boosted page count and new component and gaming content – courtesy of Atomic. We're bringing across our outstanding game reviews, our hardware expertise, and our unmatched industry access to PC & Tech Authority, and we're bringing some of our classic writers, too. In fact, PC & Tech Authority's editor will be John Gillooly – a familiar Atomic name – David Hollingworth will still be looking after games, and we'll have regulars like Ashton Mills and Dan Rutter joining us too.

This means you'll also be getting more pages, more content, a cover DVD, a free digital sub, and a lot of classic Atomic writers, at the old Atomic price.

That's a great deal!

If you have any questions or want to extend your subscription, please call 1300 610 765.

For our regular readers, we hope you'll seek out PC & Tech Authority on the newsstand and give us a go. We think we're creating something pretty special.

But apart from selling you on the idea of a combined PC & Tech Authority, I want to thank all of you guys, our readers. We would never have made it this far without you, and that's one of the reasons we're keeping our forums, even though the sites will also merge on the 2<sup>nd</sup> of January. We think Atomic is unique, and deserves a unique place.

And I hope I'll see you there.

**David Hollingworth**

Managing Editor: Atomic, PC & Tech Authority



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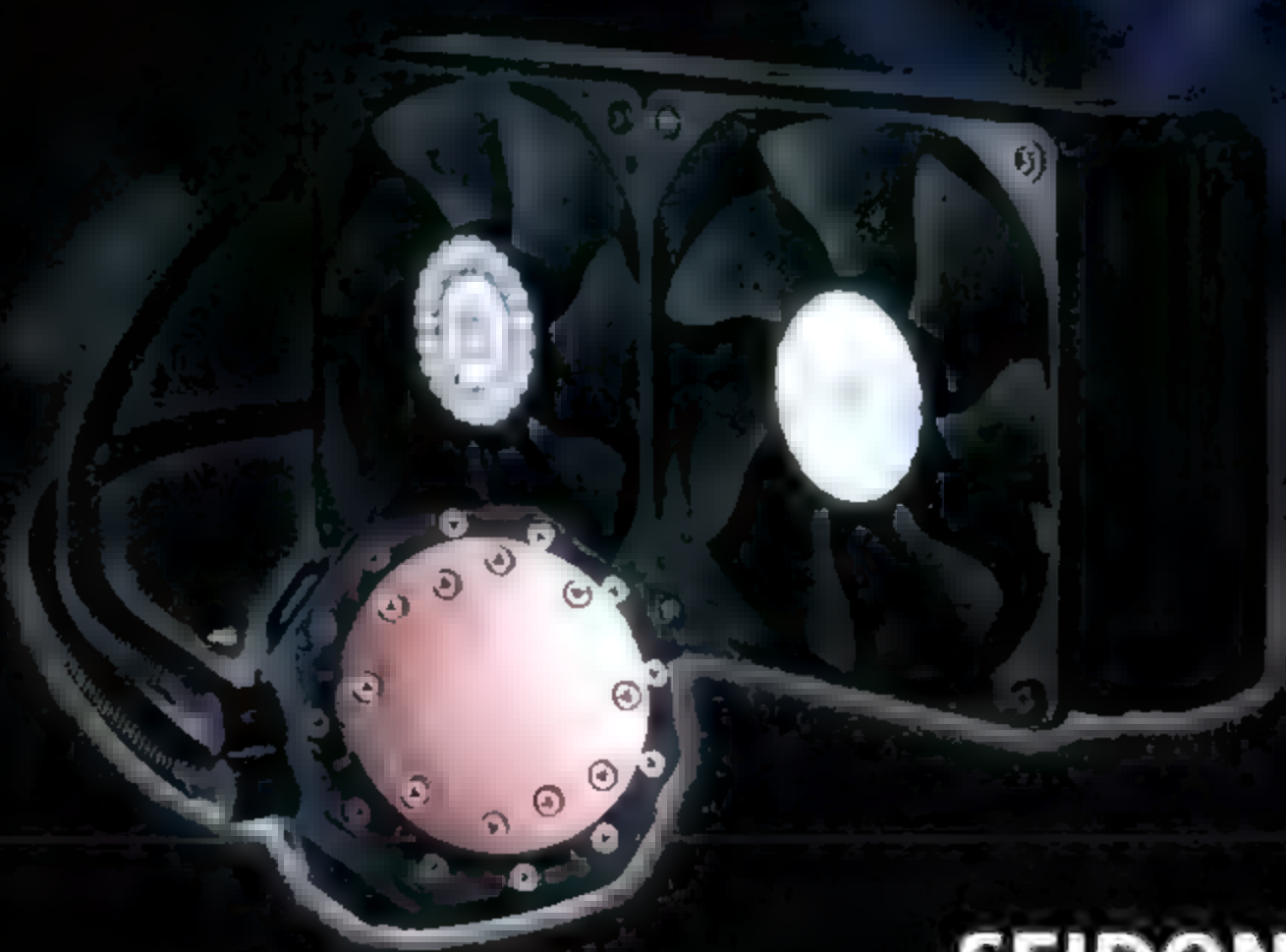
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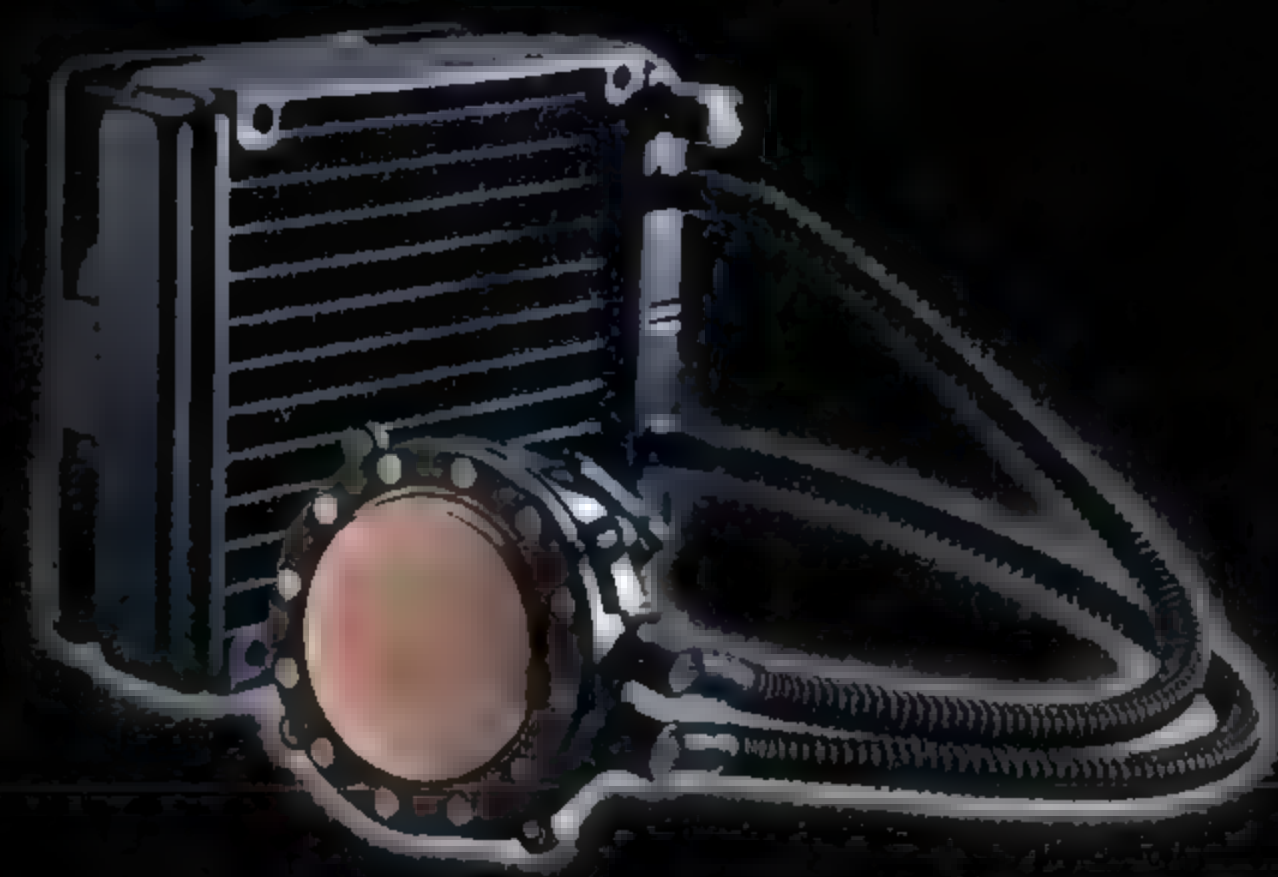
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# TUTORIAL

## HANDS-ON TUTORIALS FOR THE TECHNICALLY MINDED

Nobody ever really expects Atomic to last when it was launched way back in 2001. We reckon that twelve years has been a pretty bloody good tenure with that in mind.

One of the real drivers of Atomic has been universities, and odds are you first read the magazine as part of the educational process. One of our proudest early moments on the magazine was being told by an Academic that

he wanted to write for Atomic because his students paid more attention to the magazine than they did his lectures. For a bunch of guys who did neither journalism nor computing degrees, there was no higher praise.

Atomic owes a lot of its roots to long afternoons spent at the Macquarie Uni bar back in the nineties. If you spend time learning, and mix in some fun, who knows what will emerge.

## TUTORIAL CONTENTS

### ATOMIC.EDU

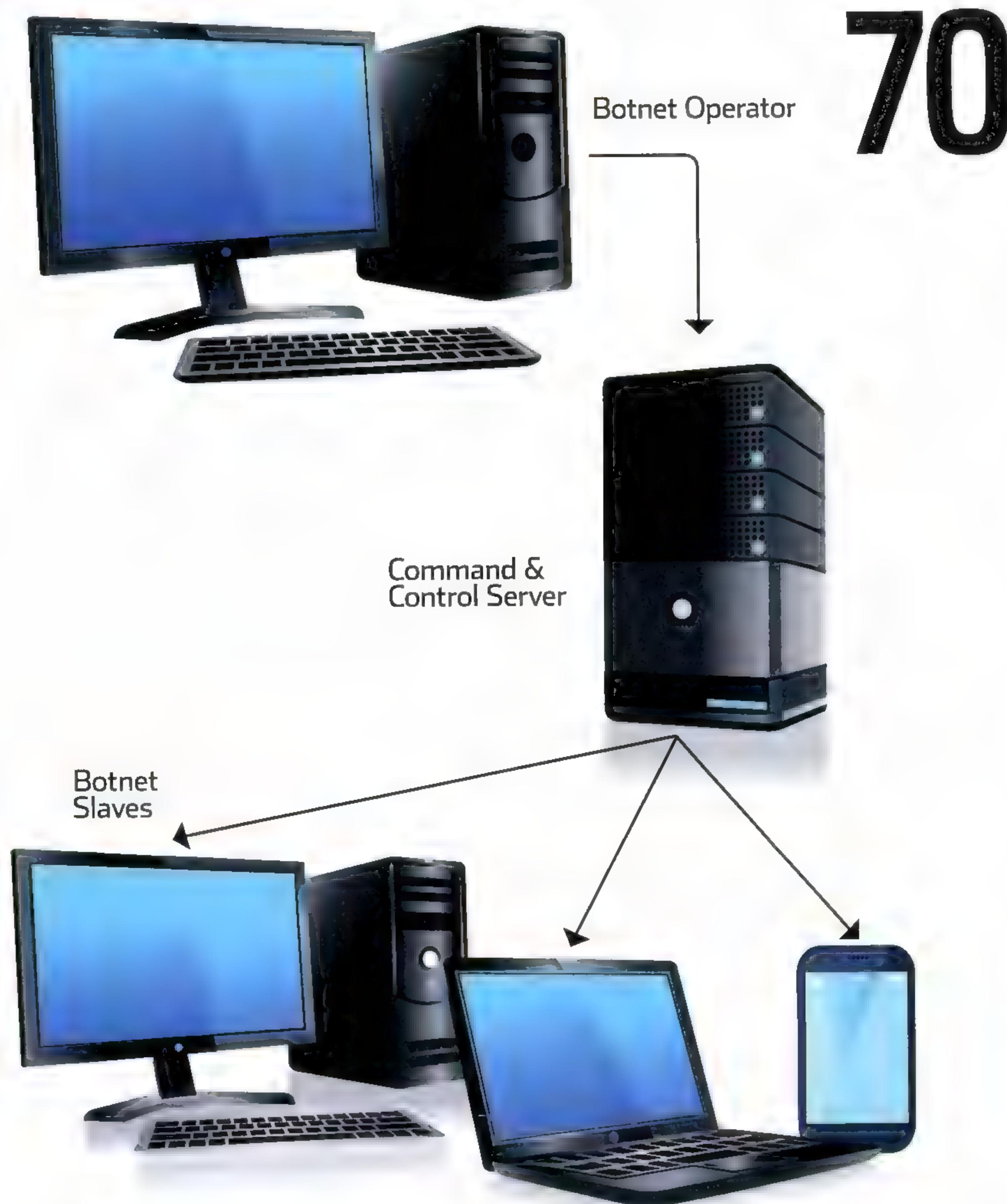
Chris Taylor steps through the Portal and checks out just how Valve is pushing games as an educational tool.

70

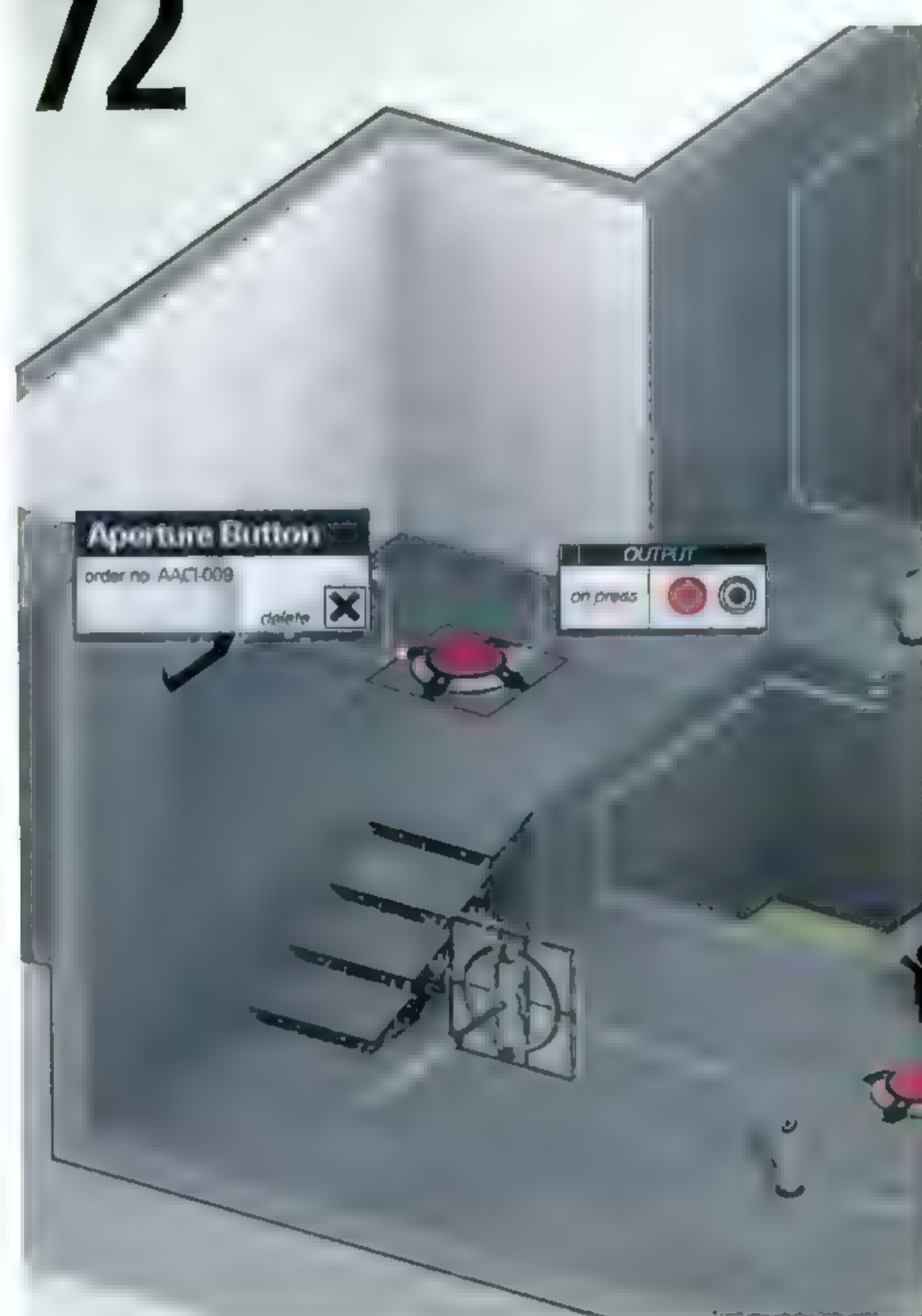
### BOTNETS

Luke Millanta delves into the murky world of Botnets, looking at both how they work, and what you can do to avoid getting caught running processes for your friendly Russian cybercriminal.

72



72





# Valve and educational games



Yes, Portal 2 really is helping educators – with science!

**T**he thing about educational games is mostly they're not very fun. Sure, I mean, there's edutainment to SimCity and that sort of thing – and for a while there tycoon games were all the rage – are amusing enough, but games built from the ground up to be educational, games designed to really teach you something... well, they tend not to be good. They might have some great links to the curriculum, earning points on that front, but they often don't seem particularly well-designed when you treat them as games. There is a lot educational merit, perhaps, but limited entertainment value. At least if you're older than twelve and past the point of viewing simply using a computer as a novelty in itself that makes even a shit game tolerable.

Okay. I'm being a little harsh. I'm sure that out there, tucked away in those chunky teachers' resource catalogues that land on the staff room table every few weeks that I could find an edutainment game that was amusing even to my students who spend every hour between 3:30PM Friday and 9:00AM Monday beating the shit out of villains in Arkham City. Educational games just don't stack up, fun-wise, against their less-than-educational counterparts.

Valve – as in the long-awaited Half-Life 3 guys, the Steam guys – are presumably aware of this problem. Hence Steam for Schools. It's a version of Steam pitched at school teachers and includes a free version of Portal 2. The idea being that Portal 2 could serve as an entertaining and engaging way of delivering lessons.

This month we spoke to Yasser Malaika – designer, developer and artist at Valve – as well as his colleague Leslie Redd, Director of Educational Programs. "In 2011 Gabe Newell, our co-founder and president, spoke at the Games for Learning Institute day at the Games for Change Festival. He questioned what the fundamental difference was between commercial and educational games and shared examples of creative educational applications of our titles, especially the Portal franchise. Simultaneously, the Portal 2 Puzzle Maker (Perpetual Testing Initiative) was being developed and it became clear that it could be very attractive on an educational level. We started playtesting the Puzzle Maker with teachers and students and found that the

students found the Puzzle Maker engaging, and that teachers were identifying all sorts of ways they could utilise it in the classroom."

"In September 2011 the program started to gel when Valve went public with our intent to collaborate with the educational community. We received hundreds of emails, many from educators. We recruited some teachers into the beta and many started developing teaching-specific content and implementing it in their classrooms. This was valuable because instead of just using the game to demonstrate, the teachers could customise chambers, focusing on the content of that particular lesson as they saw fit. Also, a few teachers took it a step further and put the students in front of the Puzzle Maker, asking them to design their own experiments to, for example, show terminal velocity. This 'virtual lab bench' really leverages the strength of games as a medium of exploration in a powerful way. Some teachers even had students use the Puzzle Maker to teach younger students, using the notion that one of the best ways to learn a subject is to teach it to someone else."

Among teachers there's a common fear of simply entertaining the students rather than actually educating them. There so many products that can capture the imaginations of students and educate them, but suffer from a problem – sometimes the entertainment

**You've got 21st century skills such as problem-solving, and collaboration if it is a co-op or multiplayer game.**

potential of a product is more immediately obvious than the educational potential. And when it comes to educational software, this matters. Part of being a good ICT teacher – or a good teacher, really – is not just offering students something engaging but explicitly directing their attention to what the experience is meant to be teaching them. We wondered if the team at Valve encountered this attitude.

"Video games are a tool for learning as are other forms of media like movies and videos. Educators use discretion as to what aligns to the educational experience and we expect Valve's Teach with Portals program will be interesting to some and not others. We are trying to support educators, for instance encouraging submitted lesson plans to align to standards like the

Common Core and Next Generation Science Standards [these are US curriculum documents] and by having educators themselves create the content found on the site."

"What we've heard from teachers with whom we've worked is that well designed video games are a great learning experience. A well designed game teaches skills and reinforces them, challenges and motivates without becoming too frustrating, provides the construct to try and try again with failure being low stakes so as not to discourage continued play. You've got 21st Century skills such as problem-solving, and collaboration if it is a co-op or multi-player game."

"Using the Puzzle Maker, the player creates their own level of the game, in this case a puzzle they need to solve themselves and encourage







others to. Players need to bring creativity, systems thinking and critical thinking to the table to make a fun, motivating and challenging experience."

Valve views Portal 2 Puzzle Maker as having a lot of educational potential. "We've been following some teachers and their classes, mostly game design, maths and physics from grades 6-12. We've also been hearing from teachers using it in the classroom with students as young as age 5 and for subjects as diverse as English and Chemistry."

Valve has also continued to support and modify the educational version of Portal 2 based on user feedback. "We recently responded to educator requests and added elements to the educational version of the Portal 2 Puzzle Maker. We added a contraption cube and one is able to change its mass, elasticity and friction. One can manipulate force in Newtons and the angles of aerial faith plates. There is also a speech bubble

for leaving commentary and an in-game timer. We've seen students really like the ability to leave notes or clues in game."

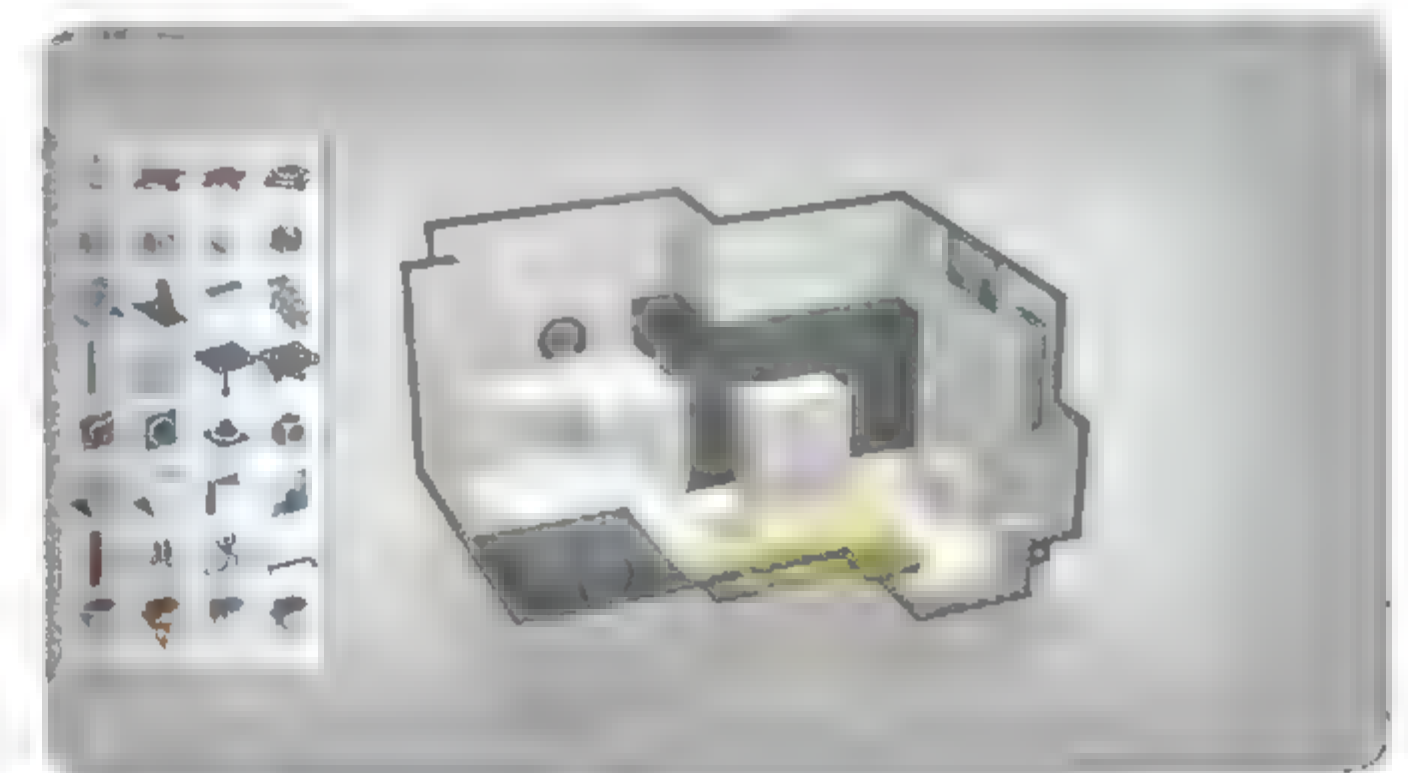
One of the key deciding points in implementing anything in schools is money. Public schools especially have very limited funds. At my last school, for instance, we had iPads – the wonders of some grant – but almost no money to purchase apps for them. If a school is going to commit to a purchase it has to offer a sense of value for money – being really cool or entertaining isn't enough, a piece of educational software needs to (appear as it will, anyway) deliver results.

A lot of educational software is quite expensive. Sure, Microsoft and whoever else offer student/teacher discounts and that sort of thing, but we're talking about stuff put out by dedicated educational software developers. You'd be surprised how much a bit of graphing software that's age-appropriate for lower primary students can cost. Perhaps in response to this, Valve's educational version of Portal 2 is free.

"Valve offers many of our tools to our community for free. We are always excited to see what they do with them. We hope that offering Portal 2 Puzzle Maker – Education Version to teachers and students at no charge will encourage some interesting experiences in the classroom."

We'd like to think – and me, as a teacher,

especially – that this was a sign of things to come. There are numerous titles that, modified and reduced in price (or better yet distributed free of charge), would work nicely in classrooms. The Sim/Tycoon games come to mind, for example. Of course, even if the software is very cheap or free, there are still hurdles to overcome. There's the matter of teacher skill and knowledge. Coming to grips with a tool that lets you design a 'puzzle' or videogame level would consume time a teacher may not have or be willing to dedicate to such a purpose. There's also the reality that modern games – and we're not saying Portal 2 is a cutting edge game on the graphics front, here – might cause a bit of a headache for some of the dated machines that schools use. The lease cycles that ensure no one (in my current school, at least) sits at a machine that's from more than three years ago would probably help but that is a serious and prevalent technical limitation. (f)



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# Botnets

Luke Millanta on what they are and steps you should take to combat them

If you've worked in the IT industry, or are a member of one of the plethora of internet tech forums, there's no doubt you have heard the term "botnet". In its simplest form, a botnet is a series of computer terminals that have been infiltrated by a third party, and which are now under the control of that intruder. The infected terminals are commonly referred to as "slaves" or "zombies", while the botnet controller is often called the "herder", "master", or "operator".

In this article I explain how botnets arise and the way that a herder can make use of them. I also consider how botnets are increasing in complexity, and canvass some of the steps that law enforcement agencies are taking in a bid to stop botnets from spreading.

## How Botnets Are Created

The first step in establishing a botnet is for the herder to infiltrate and infect the computer terminals of a number of unrelated parties. Once infected with a specific piece of malware designed to recruit it into the botnet, each terminal will join the operator's internet relay chat (IRC) server and become a "slave" in the operator's botnet. Once the slave terminal has joined the IRC server it is under the operator's total control, and can be commanded to do a number of diverse tasks. The server being used to control the botnet – the command and control (C&C) server – can be combined with other servers to provide a higher level of redundancy.

Botnet operators recruit slave terminals using a range of techniques. These include identifying and exploiting web browser vulnerabilities, sending malicious file attachments via email (spam email), and by posting infected files across a range of file sharing websites.

Figure 1 illustrates the structuring of a simple botnet.

## How Botnets Are Used

Although botnets can be used to achieve a number of objectives, a herder's principal aim often boils down to be either a desire to make money, or to cause disruption to a

target. Obviously, a botnet that is being used to deliberately disrupt one or more targets runs a higher risk of being detected, and in consequence, has a shorter life expectancy than a botnet which is being used more covertly.

The most common type of botnet attack is the distributed denial of service (DDOS) attack. In a DDOS attack the herder instructs slave terminals to flood the target website with an inordinate number of requests. If the number of requests results in an overloading of the website, the target will be unable to service legitimate requests until the attack has finished. An example of a DDOS attack would be the February 2010 attack by the hacker group Anonymous, which resulted in several Australian government websites being taken offline for several hours.

While taking down a website is "cool", a smart operator uses a botnet to make money,

steal sensitive user information such as credit card numbers and PayPal account passwords. Although the number of illicit uses of botnets is limitless, they are all directed at one thing – ensuring that the botnet operator makes some serious money.

## Mobile Botnets

I have been a member of a number of major network security forums for years now and I regularly see threads asking about the existence of botnets involving mobile phones. Do they exist? I can tell you that they do, and they are becoming more prevalent.

Since the 2007 release of the iPhone, network security firms have discovered a number of botnets with smart phone-based slaves. Mobile botnets are a worrying development as many smart phones do not come packaged with an anti-virus application. In fact, there is chatter

Although the number of illicit botnets is limitless, they are all directed at one thing – ensuring that the operator makes money.

sometimes lots of it. When it comes to making money herders can do just about anything because they have essentially created their own little world where they rule supreme. One means of earning money is through "click fraud". In click fraud, a herder directs the slaves to navigate to webpages owned by the herder and then click on advertising material displayed on the webpage. Every time an advertisement is clicked the advertiser pays a fee to the publisher, thereby generating revenue for the herder.

Botnet "stings" also include sending spam emails which directs a recipient to a website promoting some scam or which contain scareware advising of a fictitious virus infection and offering services to remove the infection once a fee has been paid. Another use is in distributing spyware, which is then used to

suggesting that Apple has actively sought to prevent Kaspersky from developing such a product. Absence of anti-virus software means that once a botnet is established, there is every chance that it will spread from phone to phone until it is discovered and shutdown by a law enforcement agency or network security firm. One example of a botnet operating with mobile devices is the Zeus Botnet (also known as ZBot). In early 2012 Kaspersky Labs discovered that several updated versions of Zeus were being used to infect several BlackBerry and Android phones. Once infected the botnet operator could use these infected phones to steal user bank account details, send spam, steal Facebook and email account information, send text messages and perform various other activities.

In a world increasingly driven by smart phones



it is not surprising that botnets and Remote Access Tools (RATs) are being developed for these devices. I believe that over the next couple of years, we will see a dramatic rise in mobile phone-based malware simply due to the inertia of many smart phone manufacturers.

## The war against botnets

In the war against botnets, there are several approaches that law enforcement agencies and network security firms currently employ. Once the existence of a botnet is identified, one common approach used by law enforcement agencies and network security firms to disrupt its operation is to obtain control of the botnet's command and control servers. Once control of the servers has been achieved, the botnet operator can be effectively locked out and the botnet dismantled. This approach has been successfully employed on several occasions. However there have also been instances of the herder regaining control of the botnet and then seeking to exact vengeance against those that attempted to stop their often lucrative operation. A prime example of this occurred in 2009 when the Mariposa Working Group (MWG) gained control of the Mariposa Botnet's command and control server and attempted to lock out the herder. Everything was going to plan until the botnet operators regained control and struck back – big time. The botnet operators launched a broad DDOS attack which included an attack on the Canadian network security company, Defence Intelligence. The attack not only disrupted Defence Intelligence but also disrupted other users who were attempting to connect to the internet through the same Internet Service Provider.

Another way that law enforcement agencies or a Domain Name Service hosting company can disrupt a botnet is to null route it. Null routing can be used where a botnet is using a free DNS host service to direct a sub-domain to an IRC server. If this service is removed a crippling blow is dealt to the botnet.

## Stopping a botnet

There are several actions that you can take to lessen the chances of your home desktop terminal or laptop becoming a botnet slave. Although more advanced approaches than the ones considered below are available, their cost and sophistication generally restricts them to the corporate environment and renders them inappropriate to the domestic setting. Strategies that can be employed with minimum effort and cost include:

1. **Anti-Virus:** You should already have an anti-virus installed. If you don't, you should really think about turning your computer off and sitting in the naughty corner. Anti-virus software is an essential part of owning a computer because it provides an important line of defence against the nastier side of the internet. Fortright manufacturers of anti-virus products will readily admit that their

product will not stop all infections. However, their products will stop the majority of threats. Installing an anti-virus, and most importantly, keeping it up to date is a critical step in preventing a botnet infection.

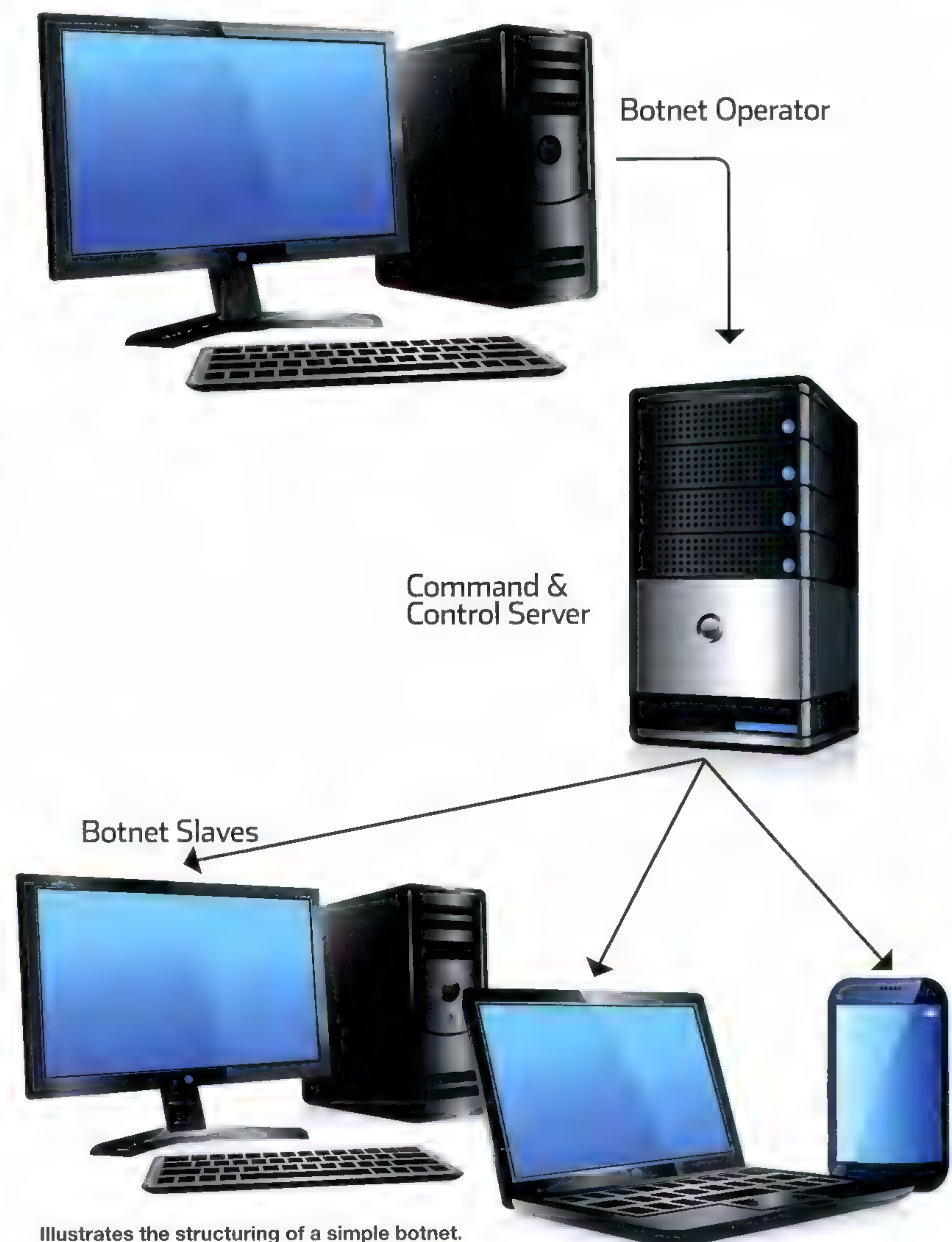
2. **Trusted Downloads:** Only download files from trusted sources. So many of my friends have seen their computers infected simply as the result of downloading a malicious file from a dodgy website. If you feel compelled to download a file, make sure that you scan it with your anti-virus software before opening it. This simple step should avoid the majority of infections.

3. **Spam:** Never open attachments, or follow links, in unsolicited emails. Spam emails are well known for containing malicious links that result in computer terminals being turned into botnet slaves. Stay away from emails offering such attractive services as free Viagra, charity penis extensions, or free workout guides. They aren't legitimate; if they were, they wouldn't be free.

4. **Firewall:** Ensure that your firewall is always active. A firewall places a protective barrier between you and the internet. There is no good reason for turning off your firewall, even for a minute. Turning it off, and then connecting to the net, greatly increases your chances of a malware infection.

5. **Software Updates:** Ensure that all software is up to date. Most major software applications have a built-in option that permits automatic installation updates. Selecting this option is recommended as it allows updates to be installed as soon as they become available and it removes the need for the user to initiate their installation.

Taking these simple steps should reduce significantly the risk of your desktop terminal, laptop, or mobile device becoming enmeshed in a botnet. Constant vigilance is necessary because while law enforcement agencies regularly do battle with the perpetrators of this insidious creature of cyberspace, the unfortunate truth is that for every botnet that is successfully removed, there is another waiting to take its place.



Illustrates the structuring of a simple botnet.



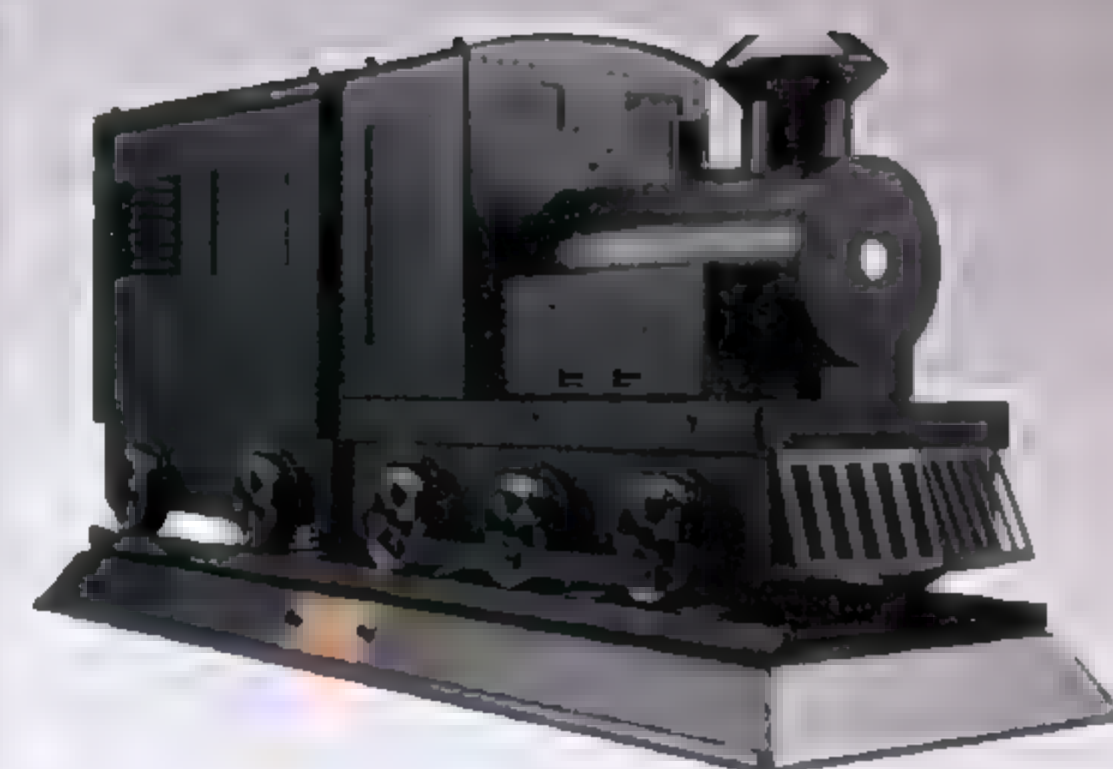


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# GAMEPLAY

## GAMES, GAMING AND GEEKERY COVERED... ATOMIC-STYLE

**T**he future for PC games is looking bright indeed, with everything from Obsidian's Project Eternity to Chris Roberts' Star Citizen getting us buzzing in the Atomic labs this month..

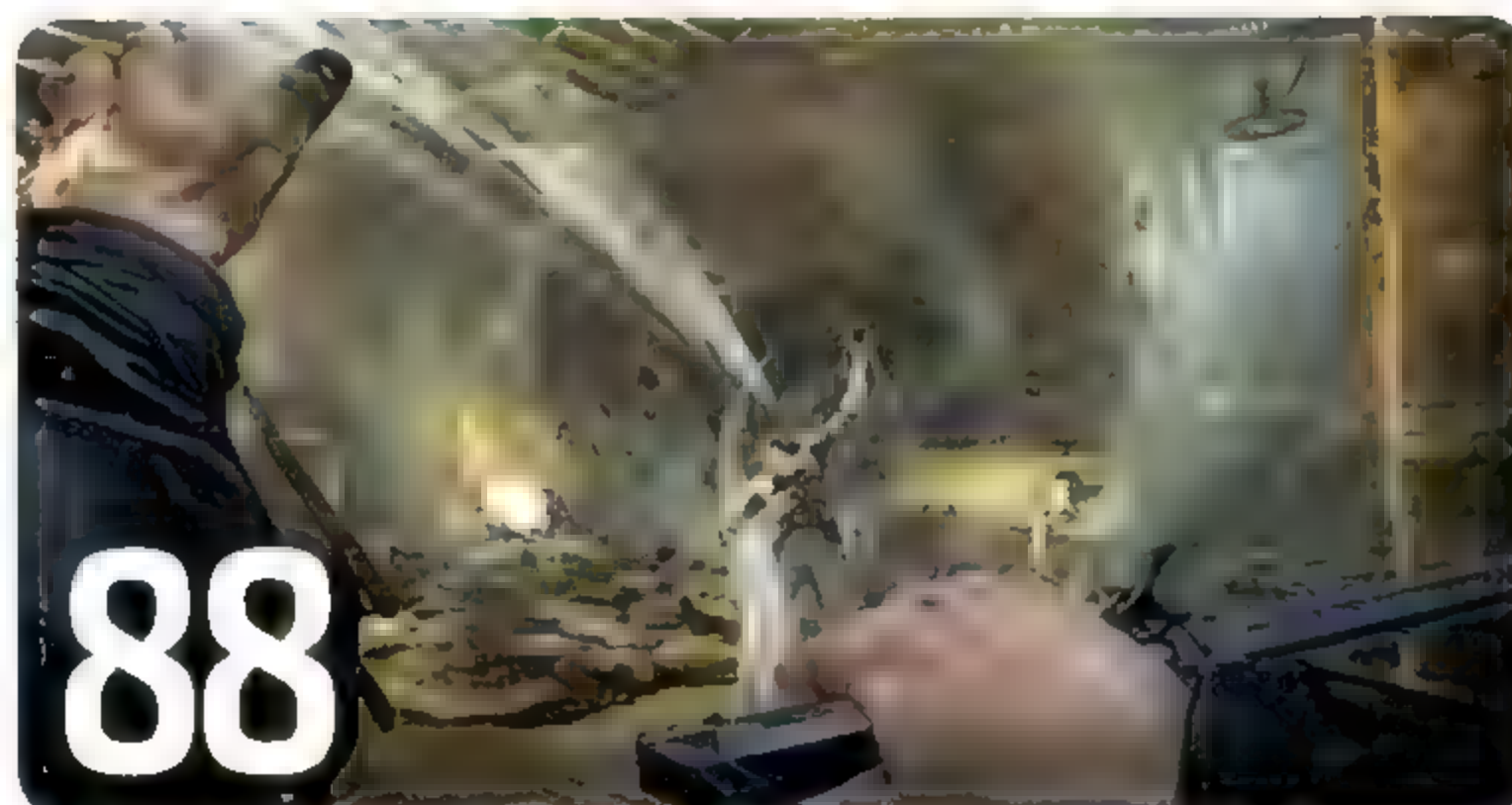
This month we see the last of round one of the big titles arrive, with Halo 4, ACIII, Hitman: Absolution, Need for Speed: Most Wanted, Medal of Honor: Warfighter and many more. Now it is time for the gap, as publishers avoid

the inevitability that is this years Call of Duty: The BLOPSening. We hope that you'll join us at our new home as part of PC & Tech Authority, magazine where we'll be continuing to deliver the games coverage from the writers that you know and love. Engine Room will return, as will our reviews, and we can't wait to show them off.

For now, happy Christmas gaming, we'll see you on the other side!

## CONTENTS

<b>ENGINE ROOM:</b>	
Need for Speed: Most Wanted	76
Far Cry 3 Preview	80
Hitman: Absolution	82
Need for Speed: Most Wanted	84
Torchlight 2	86
Dishonored	88
Halo 4	90
Assassin's Creed III	92
Medal of Honor: Warfighter	94







# MOST WANTED:

## A revolutionised racing experience

Eager to toss tradition out of the window of a speeding car, Criterion Games took a gamble on the latest Need for Speed game. Engine Room mechanic Nathan Lawrence does a full-car service on the modded beast

**A**s far as niche games go, the racing genre has to be one of the biggest. Racing franchises rise and fall based on the delicate balance they walk between hardcore authenticity and mainstream-friendly accessibility. The racing elite tend to err on the side of simulators; the upper-echelons of purists sinking thousands of dollars into creating multi-screen, fully customised racing pods where a USB wheel and pedals are just the beginning.

On the other extreme, the jaded masses – the writer of this piece included – tend to avoid any game whose sole selling point is ‘CARSI’; unless, of course, the cars are ‘upgraded’ with offensive and defensive weapons, modding the racing genre with crowd-friendly action tropes. Regardless of where you fall on the car-loving scale, there is an undeniable truth that many of us can doubtlessly agree on: the core racing experience is difficult to evolve.

### Fresh paint job

Much like a sports franchise with a yearly turnaround, there's not a whole lot about the core racing experience that can change. New cars will be released, dizzying speeds achieved and new places to race may open up but, for all intents and purposes, the player will still be throwing X car around Y race track to achieve Z accolade.

In many respects, this has made year-in year-out racing titles a bit lazy, as they rely on the seemingly immovable car + fixed track + best time traditions of yesteryear that are apparently essential for a racing game to be defined as such. Enter Criterion Games to tinker with the

engine and – make or break – forever place doubt in the mind of the consumer as to what exactly is essential for a racing game, and what exactly needs to change for the genre to evolve.

### The little engine that could

While English developer Criterion certainly isn't a stranger to the concept of open-world racing – as evidenced by 2008's *Burnout Paradise* – by far the most impressive feat is that it's laying this concept as the foundation of the biggest racing franchise: *Need for Speed*. After the critical acclaim and commercial success of Criterion's first foray into EA's renowned racing franchise – *Need for Speed Hot Pursuit* – and the experimental but ultimately disappointing EA Blackbox road trip *Need for Speed The Run*, the

English dev team were free to take the best of the last *Burnout* game and fuel-inject it into EA's juggernaut racing series.

Producer Leanne Loombe was quick to point out that Criterion doesn't make sequels, which equates to a lack of numbers in what is, in actuality, the second game in the *Most Wanted* spinoff. Psychologically, this also seems to drive the quirky English developer to treat *Need for Speed Most Wanted* as an original IP.

### Defying expectations

In fact, apart from the *Need for Speed* moniker and the pursuit of 10 titular ‘Most Wanted’ cars, Criterion really is test driving the franchise in its own unique way. Seamless open-world racing drives the game, but the most impressive initial







traditional defiance comes in the form of a lack of tyre-burning grind. While your average racing game asks players to burn rubber in a variety of racing challenges with the promise of earning new cars, Most Wanted speeds off in the opposite direction and allows access to all cars, except the 10 Most Wanted, from the outset. If you can find it in the world, you can drive it.

Curious as to how Criterion came to this road, we asked Leanne whether she felt the concept of an open-world racing game flies in the face of the traditional notion of racing on contained tracks. "No, I think that's just convention; that you have a race track and you drive around it, and you do a certain amount of laps, and you get a time, and that's the end. Why do we have to stick to that convention? You should play a game the way you want to play it, and that's really important for us. You load up that game, and you get a unique experience to you. You don't just have to go around the same race tracks as your friends; you can go into the open world with Most Wanted, you can find cars, and the order in which you find those cars might be different to the way your friend has played, and we think that's really powerful."

## The Criterion Knight

But wait, there's more. Ever fans of defying traditional notions, we were eager to hear what else Criterion was throwing into the mix to set Need for Speed Most Wanted apart as a pack leader. Creative director Alex Ward had this to say about how Most Wanted is even defying the core franchise. "It's a Need for Speed game with no visual customisation, no story, no neon lights, no cut-scenes; so that's a big one for the franchise. It's just got [Criterion's] DNA in it. I guess it's like Batman Begins. This is our second one, though, so this is our Dark Knight. We just try and shake it up. We have a very unique point of view at Criterion, and we always say every game reflects who we are at the time, and this one is us in 2012: loud and proud."

## Digital logbook

Battlefield 3 aficionados will be familiar with the stat-tracking potential of Battlelog; but the genesis of this social system was Autolog: a

similar feature Criterion introduced for Need for Speed Hot Pursuit. Interestingly, the origin of Autolog was the digitisation of an age-old gaming tradition in the Criterion office: keeping track of bragging rights.

Both Leanne and Alex made reference to Criterion designer Matt 'The Professor' Follett; a man Leanne begrudgingly admitted holds pretty much every pole position in the office for the various stats that Autolog 2 tracks. According to Leanne, this is made all the worse by the introduction of a Most Wanted social feature that allows players to see the face of the 'Most Wanted' player on billboards around the city. Apparently, the office is sick of seeing The Professor's face everywhere.

So the story goes, the original Autolog feature that would eventually beget Battlelog and Autolog 2 was inspired by the desire to internally track who was the top of the office. Conflict, it seems, is more than capable of arousing creativity and innovative technology.

## Autolog 2.0

Autolog 2 is set to take stat comparison to the next level with the 'CloudCompete' system. This particular feature allows players to compare, and ultimately compete, across platforms. Considering that Need for Speed Most Wanted

## Fully tuned for PC

Alex broke down the intention of what Criterion is aiming for with Most Wanted on PC. We were sufficiently impressed.

"The PC is a much bigger platform for us this time. We just moved over to DX11, and we want to do a really shit-hot PC version. We've allocated a lot more time and resources this time around, and we're going to do a shit-hot job." In fact, to put its money where its mouth is, Criterion has been previewing Most Wanted on PC. "We've been showing on PC, mostly. Obviously, with more memory, we can do better-res textures. There's more optimisation we can do. It's going to be the best PC version to date."

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<http://www.cfos.de/en/cfosspeed/rwin-expansion.htm>





is set for a simultaneous launch across PC, PlayStation 3, Xbox 360, iOS and Android, this is a big deal. When you take into account that the game's street cred system – Speed Points (SP) – can be accumulated across platforms to a single profile, the competition can start at home on a fixed platform and continue out onto the streets with mobile devices.

Leanne emphasised the importance of this mod in terms of how it ties into the open-world setting of Most Wanted. "The distraction gameplay is really important to us, so we wanted to really take that to the next level with Most Wanted. We've got Autolog comparing you against everything, basically. Every time you set, every jump you set, every distance you set, Autolog stores that in CloudCompete. We've got speed cameras and they're dotted all around the world and, if you drive up to the speed camera, it will bring up a speed wall [pop-up] to show you

**Every time you set, every jump you set, every distance you set, Autolog stores that in CloudCompete.**

what speed your friends have got in that as you drive past it. We've also got smash gates, so the amount of smash gates you go through and find in the open world, and then we've got the billboards. And that was really important for us."

### Engine specifics

We would be remiss if we didn't ask the team of a racing game about the engine behind the car engines of Most Wanted. Alex shone a light on what's beneath the hood of the modified Chameleon game engine. "The engine is very powerful, it's been iterated on for many years. It's been a very good streaming engine. We have a

lot of cool stuff happening with the lighting, for instance. My favourite thing in the software is the new handling. It's far more physical, it's far more dynamic, and it's a far deeper simulation base than we've ever had. We love working with real cars. We really wanted to play that off. The balance of the car when it's front-wheel drive, rear-wheel drive, all-wheel drive is more pronounced and more realistic than ever before, but still you can really throw the car around. That's really important."

That sounds like a dream come true for car



### Flame on!

With an impressive garage of licenced automobiles set to be featured in Most Wanted, we were curious to know whether any of the car manufacturers got a bit squeamish at the sight of their cars being banged up on screen. Alex offered this reply. "We have a whole team dedicated to that. We work really closely with Porsche, Lamborghini, Pagani, all that stuff. They're all quite into it. We get pretty much freedom to do whatever we want, short of setting the cars on fire. Some manufacturers aren't in the game because of the police. They don't want to their cars to be chased by the police. But we've got Dodge, Porsche, and Aston Martin. They're all down with it."






enthusiasts, but what about mainstream gamers that want to pick up and play? "We want the widest variety of players to have the most fun driving those cars. So we say, 'Drive it like you stole it,' because everyone wants to drive like a stuntman, right? If it was a simulation, it'd be a lot duller. We built handling for the open world. The player has to be able to make sudden left/right decisions. That's when a car's always going to understeer so much. If you're barrelling down the street being chased by the law and I say, 'Take the next left!' and you're in a muscle car and you hit the brake, you can't make the turn, you understeer, that'd get pretty old really quick, right?" Speaking as one who isn't a fan of your average racing game, it sure would.

## Trading SP for SP

Criterion's emphasis on the fully connected gameplay experience that drives players to collect Speed Points emphasises a multiplayer feature set over the lone single-player experience. We were curious to know whether Criterion foresaw the end of single-player with the current trend towards lone experiences that are invaded or augmented – depending on how you see it – by friend stats. Leanne had this to say. "I don't think so. I think it's all becoming one connected experience, and I think that's the

way we need to look at it. I think multiplayer is becoming more important, but just connected in general is really important, and I think it becomes one whole connected gameplay."

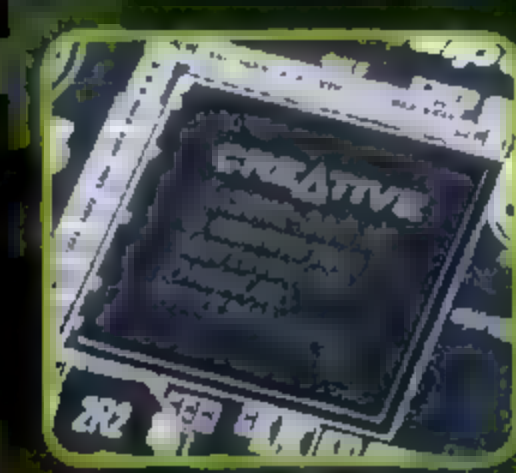
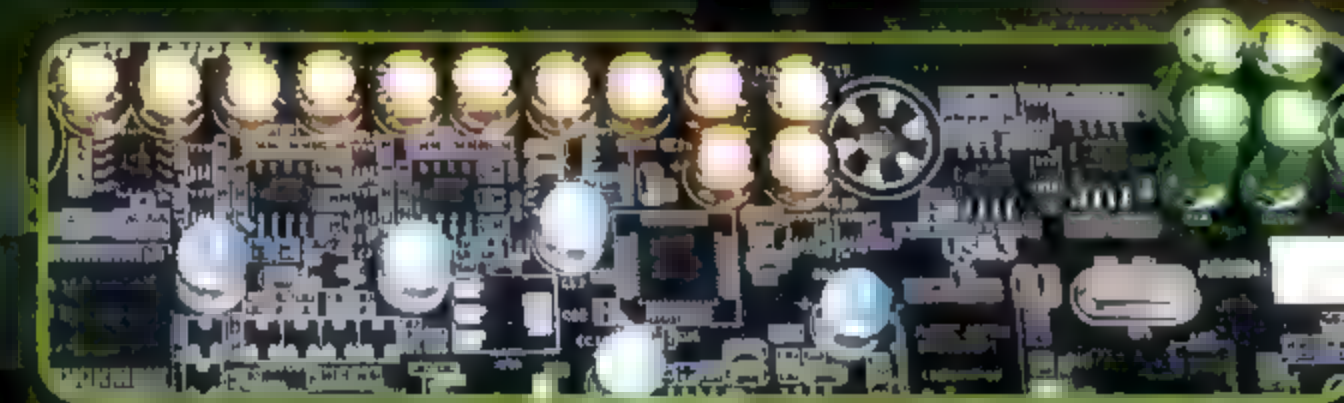
Alex was somewhat controversial in his response. "I hope so. I just believe that everything is going to be totally connected. I normally jump straight into the multiplayer and single-player is something I get around to. That's just the way of the world, right? Facebook is rubbish single-player. Offline is just useless. Twitter when you're on your own isn't much fun. We just like friends; we like playing with friends; we like bringing people together. The world's changed a lot since we started making games. We change with it. That's what we're going to do. I think every game will end up having some RPG element, really, going forward. This could well be the last single-player game ever made."

While we doubt that Alex is correct in his final-sentence prediction, the tendency for modern titles to emphasise internet-connected feature sets is undeniable. What's yet to be seen, though, is whether Criterion's defiance of traditional racing staples can become the new standard. At the very least, we're predicting the competition will be looking at Need for Speed Most Wanted very, very closely. 



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# Far Cry 3

Ubisoft's next shooter is looking expansive, violent, and full of things that want to bite you.

**A**fter playing three hours of Far Cry 3 recently, I'm pleased to say, right up front, that it's actually delivering a pretty damn good game. It's taken the greenery and exotic island location of the first game, the sense of place and faction-fighting from the second – along with some very pretty environmental effects – and combined them all with some of the most nasty characters you'll ever see in a game. Far Cry 3's villainy is far beyond the pale – Vas, a dark, nasty figure more akin to the Joker than any other identity in gaming, fills your monitor (and yeah, we played it on PC – looking good!) with a palpable sense of fear and dread.

However, at the same time, the game does

seem to fall into the classic trap of so many open world games before it.

There's a palpable sense of events hurrying out of control in Far Cry 3. From the opening level, which sees you escaping Vas' clutches in a very effective gaming equivalent of a 'cold open', to later missions to save your friends, or help your adopted tribal pals, to... well, there's a lot to do, and the open world is so much fun to explore.

However, while you're not on a clock, you have got some pretty intense things to do. You can, in theory, once you find out what you need to do to rescue one friend, take time out to gather crafting items, or take on sidequests, but... I don't know,

games like this always seem more than a little schizophrenic. On the one hand, they do such a good job of immersing you in the story, and Far Cry 3 is better than most; then, on the other hand, you always feel as though you're not playing the game properly if you aren't ignoring these important, friend-saving quests to instead pick flowers or kill pigs, or whatever.

Perhaps the game has a some pauses built in later on, where the plot effectively stops a bit so you can get around and do stuff, but I kind of doubt it.

That said, Far Cry 3 adds a tonne of depth to the standard FPS. Not only do you get miles of open world to run, swim, drive, and even







fly over, but there are two whole new layers of game data to obsess over.

As mentioned, there's a pretty robust crafting element built in, and while you start out with relatively little weapon and ammo carrying capacity, this is the way to boost it, and much more. You can collect plants, animal hides, and more to create healing potions, animal and insect repellents, bigger bags, larger wallets, ammo bandoliers... lots of stuff. Some of this is pretty essential, like extra holsters and slings, others you can kind of get by without.

What this system does reinforce, though, is the player's interaction with the jungle. Dennis, the NPC who nurses you back to health after escaping Vas, tells you that you must become one with the jungle, and this idea of self-sufficiency is found within the ability to exist purely off the land, if you choose. Sure, you need stores and such to find and buy guns and ammo and other upgrades, but if you wanted, you could – in theory – just rely on a bow and handmade arrows. That's actually pretty cool.

The other thing that I know I'll be worrying about are the game's three skill trees. A whole new experience system is now included in the game, and while it's far less intrusive than, say, Borderland's, it certainly adds a lot of new elements to the game. The three trees are split by animal types, each representing ranged, close quarters, and, ah, something else – I was busy punching komodo dragons! These trees are pretty extensive – unless you obsess over every side-mission and going out of your way to explore and earn max XP, chances are you won't unlock everything. But even the early skills are neat, and reflect the all-important plot point that you, as the game's protagonist, are not an action hero.

A lot of games take things like cooking grenades, or even stealth-kills, as a rote thing, but Far Cry 3's protagonist starts off scared, alone, and really not that good – at anything. Ubisoft's trying to present Far Cry 3 as very much a dark hero's journey; it remains to be seen whether it can pull that off, but the game makes a fine start of it.

And all of this is on top of the same,

emergent chaos of gunfights and open world action as its predecessors, with the awesome change that you can now actually effect the world – no more automatically re-populating check-points! Random gunfights are wonderfully free-flowing; in one instance, we turned a corner while driving along a road, only to find it blocked by a car, and a party of pirates burning a body. This escalated fast, and only got worse – better? – when another pirate-car showed up (cooler than a clown car), and then a third car, though this one driven by a civilian. As the fight intensified, this poor guy ran around screaming his lungs out, until I accidentally shot him while fending off a wild boar.

The environment's pretty nasty on Rook Island – there are trippy mushrooms, snakes, boars, komodo dragons, and even crocodiles in rivers and sharks close in to shore (not to mention nasty shit like dirty needles and broken meth pipes in NPC's pockets!). It just feels alive with danger, and in a very immersive, non-intrusive kind of way – the wildlife will just as often attack bad-guys as you.

Far Cry 3 is looking like it could easily be the best of the series – it's certainly the most ambitious. Though it is looking a tad... well, traditional, for all its innovations, in the face of truly brilliant games like Dishonored and XCOM. I think Far Cry 3's story-telling, if the game allows it to properly breath, could well keep it abreast of the other big hitters of the season, though.

For now, we'll just have to wait and see, and try not to have too many nightmares about Vas. (P) DH

Xbox 360, PS3 and PC (previewed on PC)

Developer Ubisoft Montreal  
Publisher Ubisoft  
Website <http://far-cry.ubi.com/>



Huge world; lots of gameplay elements; emergent action



Distracting quest chains; bad drug hygiene.

Anticipation rating

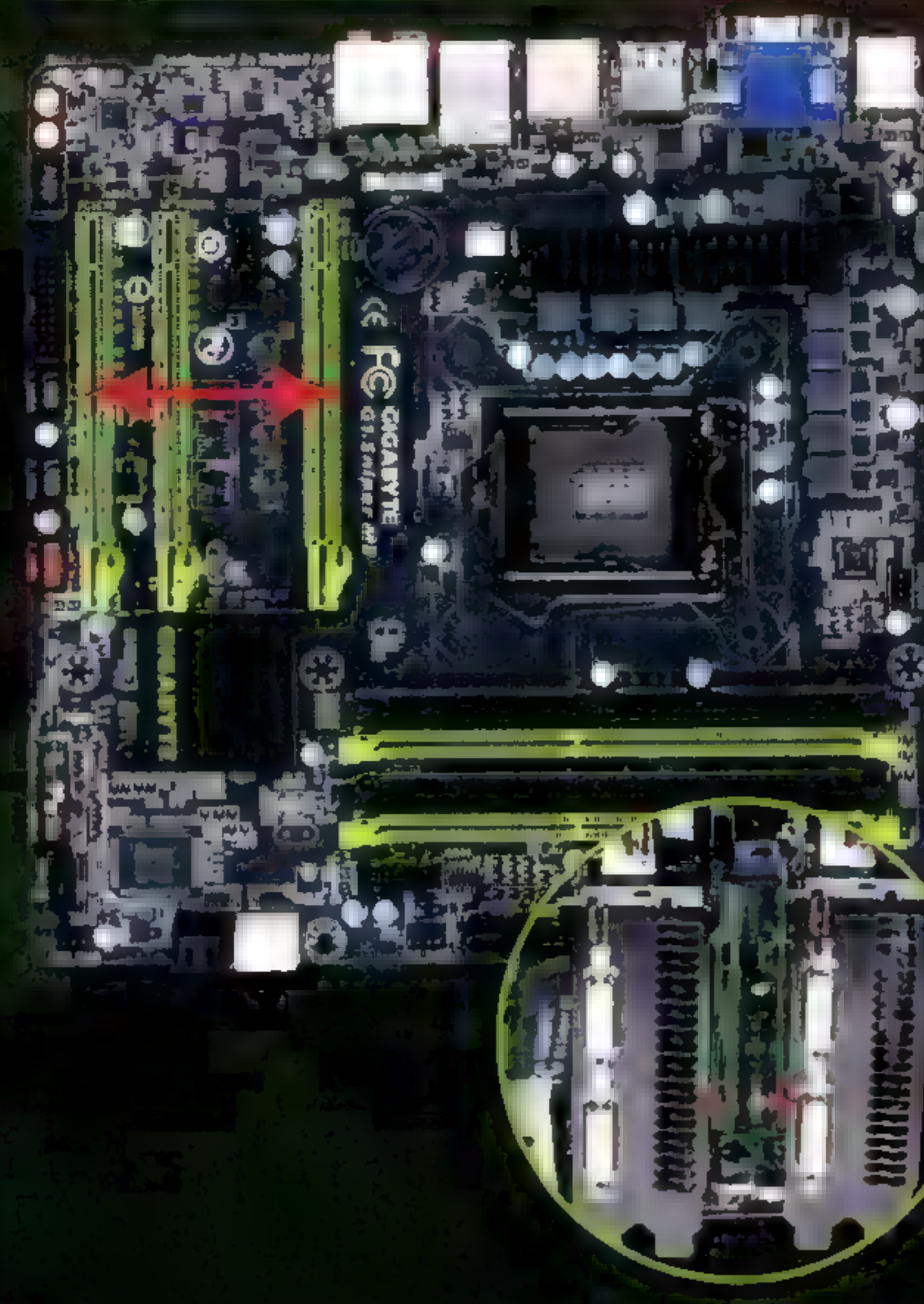
Definitely a shooter you can sink your teeth into.

89%



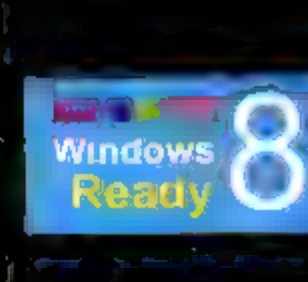
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Agent 47 is back, and while he's looking good, the game he's in could use a little bit more polish.

I have always loved the Hitman games. Their open-world approach to assassination and action was always so clever and smart, not to mention full of player choice. Sure, the sinister Agent 47 is a bit silly, as are all the overly-dramatic religious overtones, not to mention the oddly surreal politics of Agent 47's organisation, but they're all just an excuse to create elaborate puzzles of death for the player to solve.

Hitman: Absolution is aiming at all those targets – in the first few hours of the game you've got dirty politics, a dense backstory of betrayal to digest, random nuns, and lots of deep guilt and angst from Agent 47 himself. But while that's all there, the actual gameplay seems a little on the lacklustre side. That could be forgiven – after many years where Hitman was about the only game in town for this kind of thing, Dishonored's come out of nowhere and pretty much moved the goalposts overnight – were it not for the amount of bugs that plague the PC version of the game.

Taken all as a whole... it's more than a little disappointing.

## When did Hitman get Blink?!

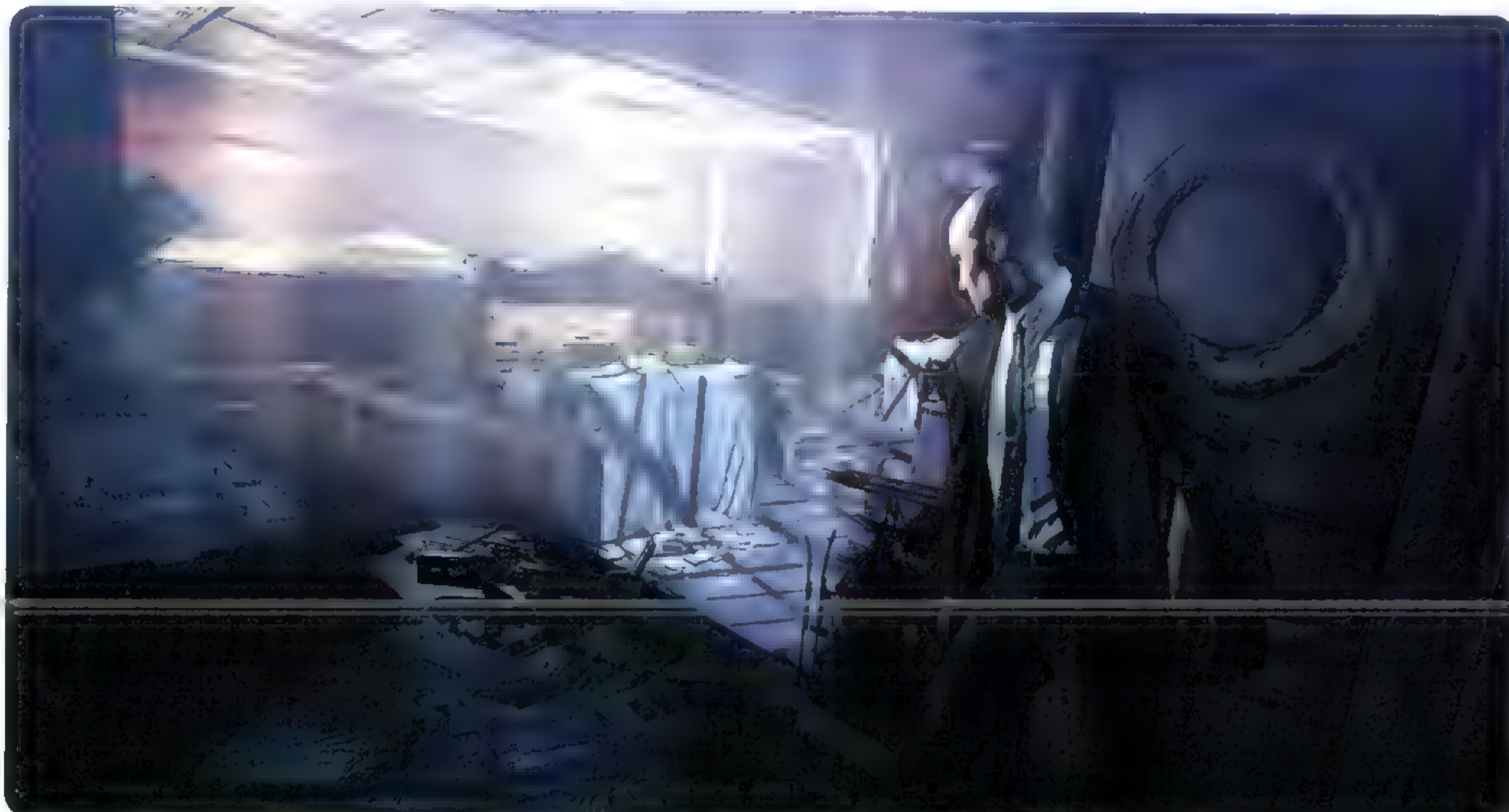
Within only a few hours of installing Hitman, I'd already lost track of the lock-ups, crashes to desktop, and general bugs. The game really doesn't like Alt-Tabbing, but is also prone to simply freeze when you're letting it do its thing without interference – even in cutscenes.

More alarming, though, are issues such as falling through floors into whole other levels of maps. Crouching in some areas sees you sink a foot into the floor, and if you're really unlucky, down you go. It would be kind of funny if you didn't often end up dying after surprising a mess of guards, or needing to backtrack all

over the level again, or simply reload and then try to avoid that spot on the floor.

At this early stage, it's hard to tell if these are going to be universal issues, or if we've just lucked out (we're reviewing before full release), but then there are things that just don't gel in the game itself, as well.

Probably the two most annoying things are the lack of a first person view, and the stupid decision to turn melee into a quick time minigame. The former is annoying because, on PC at least, previous games have always had the option, and it really makes things easier if you're not trying to peer past Agent 47's shiny dome of a skull to see where your enemies are. In some circumstances, it's almost impossible







to get a clear site picture of what's going on around you, forcing you pull out of aiming mode entirely. Similarly, it's impossible to look straight up, making some levels an exercise in frustration.

The quick time thing, though, that's just rude. You need to match a series of keystrokes to punch, counter, and successfully fight, and missing too many punches leads to game over – so rather than watching the game, you're just watching for what buttons to press, and the random sequences are simply annoying to try and match.

## Fun in the cracks

It may sound as though I've got a massive hate-on for the game, but that's not quite true. When everything works, it still delivers some amazingly awesome stealth action. The Instinct system, which helps you blend in, spot important things, or tag enemies for pin-point shooting, is – ironically – a bit hit and miss, but that aside the game is capable of being great.

One thing Hitman has always done well is combine great stealth and open-world puzzling (so, I need that key, for this door, and I've got to get it off that guy... hmm), and then when it all goes bad and you get spotted, fantastic gunfights. Absolution is no exception – even the puniest of firearms feels awesomely lethal, and things like shotguns and assault rifles are supremely destructive. With busy environments full of lots of civilians running around, the action is very tense.

And speaking of civilians, the sheer number of people in some of the levels is amazing, and the crowd AI is everything IO has hyped it to be. Getting into a gunfight in a crowded Chinese market or a packed hotel corridor are recipes for some serious collateral damage. It's not nice, but it's very cinematically gritty.

I'm a little on the fence about how heavily gamified Absolution is, though. Every level ends with a complete points score comparing your performance to the online average, and there's an exhaustive list of things you did and

didn't do right, or find. No doubt some will love having the big numbers to beat, or really get into the replay value, but it's very in your face, and a little distracting from the game's overall flow.

It works like a charm, however, in the Contracts mode, where you can create and share challenges with other players to see who's the best in all kinds of scenarios. This will certainly add a lot of longevity to the game, though, of course, it's a little hard to judge.

One thing that is clear is just how good the game looks. The Glacier engine, at Ultra, pushes out some amazing textures and lighting, and the environmental effects really make for some atmospheric and immersive level design.

Overall, Hitman: Absolution gets a lot of stuff right, but there are enough jarring mis-steps to make the game feel, at times, like too much of a chore. The incredible disconnect between fluid gunplay and lame melee events, the bugs and crashes, the challenging camera positioning all make it feel as though you're constantly fighting to have any actual fun. But when that fun does happen, you almost feel thankful. Almost... **DH**

PC, Xbox360, PS3 (Reviewed on PC)

**Developer** IO Interactive  
**Publisher** Square Enix  
**Website** Square Enix

### Gameplay

Brilliant at times, but more than a little buggy.

72

### Graphics

Certainly a very pretty game, and quite demanding.

93

### Sound

Solid, but has Agent 47 always sounded so whiny?

80

### Overall

A mixed bag of great gameplay and gamestopping crashes.

79%



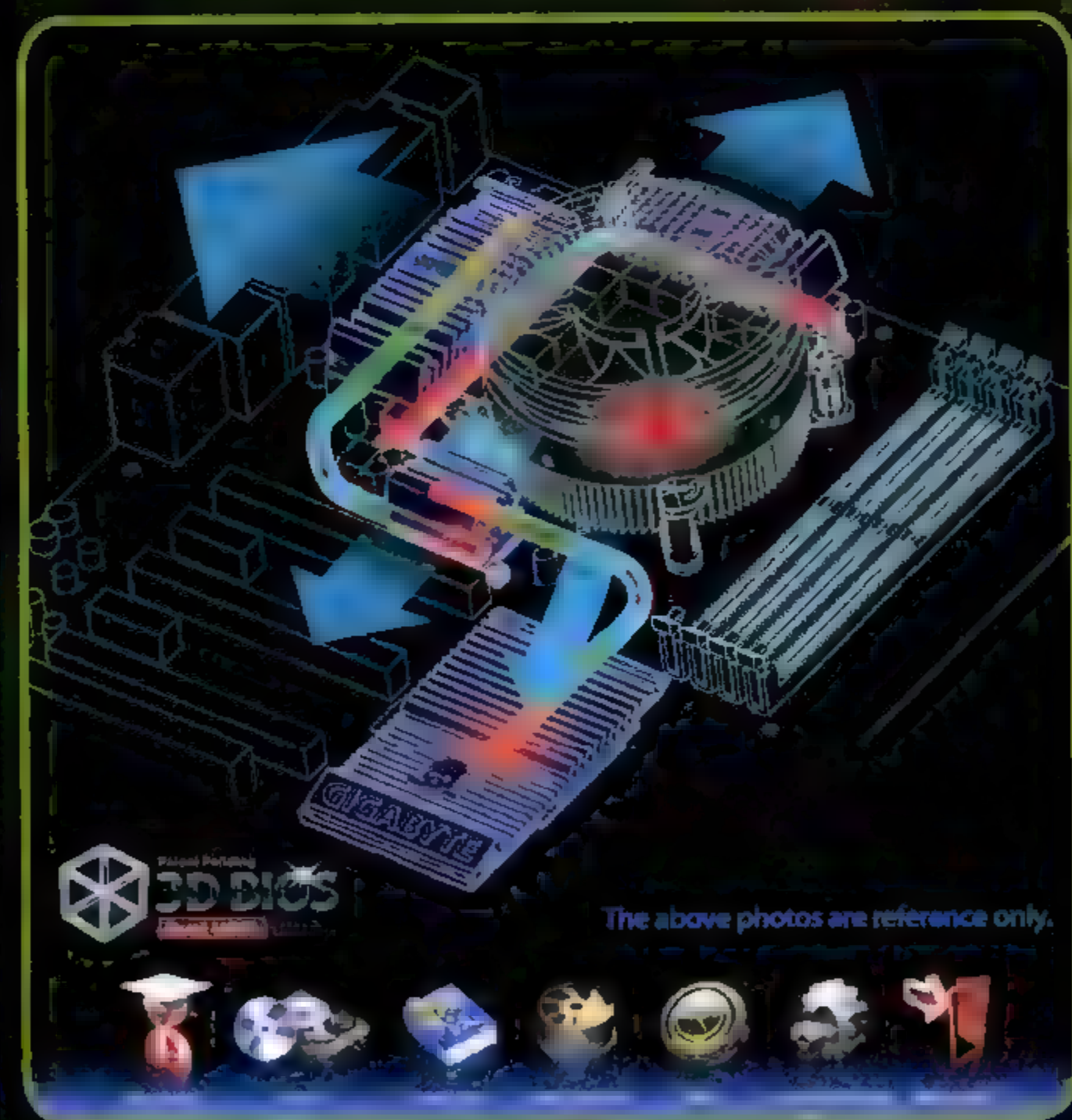
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# Need for Speed: Most Wanted

Feel the Need, the Need for an option to turn off the bloody crash cam.

**S**omewhere under the hood of Need For Speed: Most Wanted sits a really, really solid game. Criterion is the master of the arcade driving game, consistently delivering great, and occasionally excellent titles under the Burnout and Need for Speed brands.

On paper the latest iteration of the Most Wanted version of NFS looks amazing, marrying last year's Hot Pursuit with the much loved Burnout: Paradise. That means a huge, open city alongside a bunch of licensed cars as well as a police ready to pounce on your driving antics.

Unfortunately this is then overlain with EA's increasingly social focus on game development. The game features an updated version of the Autolog system used in last year's titles, which ties into your friends list on Origin (or Xbox Live and PSN for the console versions). As you drive around the city, completing challenges they get

recorded by Autolog, and compared to your friend's achievements. It is a system that is fantastic if you have a lot of driving game fans on your list, but as we discovered, less so when your friends list is made up of people who rarely play anything but Battlefield 3.

It isn't just the ever-present Autolog scoreboards that distract from the driving experience though. For some bizarre reason Criterion has decided to include the annoying Crash cam from previous titles, which has the effect of constantly pulling you away from the game every time you tap a wall or nudge an unfortunately positioned oncoming car. It does manage to show off the gloriously modelled car

destruction but happens with such frequency that it ends up feeling like an unskippable barrier to actually enjoying the game.

While the easy solution would be to not crash, this isn't exactly an option thanks to just how good a game this is. The various events demand perfection at times, and thanks to the somewhat randomised nature of oncoming traffic and police pursuits even the most twitchy of drivers will find themselves stuck watching unskippable reminders of their failure with great regularity.

As we've mentioned, once you get past these incredibly annoying aspects of Most Wanted, there is a really enjoyable experience







underneath. There are a multitude of licensed cars to play, and the way the game is structured means that you'll play a lot of them. The aim of the game is to build up Speed Points, which are given for race results as well as completing the various Autolog related challenges. Once you hit a certain number of points, you'll then unlock the ability to challenge one of the 10 'Most Wanted' drivers, and hopefully win their car.

The curious thing that Most Wanted does is that it delivers different series of races for different cars. Attached to these races are the ability to unlock upgrades for the car, so you'll want to strive for all the races on all the cars, which makes for a lot of gameplay, even beyond the core focus of building your rank and taking on the Most Wanted drivers.

As is the way with Need for Speed games, these licensed cars don't behave as they would in a title like Gran Turismo, rather they have tweaked up physics that lean heavily on the arcade side of the equation. This means the high speeds and powersliding that the franchise is famous for, and some very, very

tight races.

The open world design plays into this nicely. While the races take place on predefined courses, there are loads of shortcuts strategically placed to shave seconds off the events. There is also a somewhat subdued implementation of the Burnout takedown mechanic, which is rewarded with speed points flashed on the screen, yet somehow feels less substantial than it did in previous Criterion titles. There is also that annoying line between deftly taking out a pursuing cop car and actually crashing, at which point you get thrust back into that horrible, unskippable crash camera.

One interesting addition to the game is a system called Easydrive. Accessed with the left dpad, this allows you to do everything from view speed point challenges, swap vehicles and change out your parts on the fly. The ability to swap parts in particular has been quite important, as the various race types do suit different car setups.

Overall Need For Speed: Most Wanted is exactly what we'd expect from the tin. It is most definitely a Criterion game, wrapped in a Need



For Speed skin and covered with that horrible 'social' focus that EA has latched onto in a post Facebook world. In many ways we wish that we could just play the game, without the increasingly annoying accoutrements, but given how good the actual driving experience is we find ourselves forgiving EA regardless.

While it certainly isn't the greatest driving game of all time, it is definitely one that driving game fans should leap on. The driving model is tight, the graphics are fantastic and there is very much the ability to lose oneself in the open world playground delivered.



Xbox 360, PS3, PC (reviewed on PC)

Developer Criterion Games  
Publisher EA  
Website [www.needforspeed.com](http://www.needforspeed.com)

**Gameplay**  
Some fine arcade action.

**85**

**Graphics**  
Looks gorgeous in action.

**90**

**Sound**  
Beefy car sounds and eminently turn-offable music.

**90**

**Overall**  
Comes dangerously close to greatness

**85%**





There's more fun to be had in Torchlight 2 than in almost any other game this year...

**F**rom the minds of the developers who worked on the Diablo series, Torchlight 1 was a hit right out of left field. Although it was missing various gameplay elements, such as multiplayer and real longevity, it still won gamers over with its fun and addictive gameplay. Soon after its success, the sequel was announced, promising to be bigger and better than its predecessor.

Set years after the original, the antagonist (The Alchemist), corrupted by the Ember Blight, destroys the town of Torchlight and looks to wreck the balance between the world's six elements. The plot itself is quite complicated and lacks suspense or clarity, but most of the

time you won't be paying attention as to why you're going to the next designated area for your quest.

Instead you'll be enjoying the trip itself.

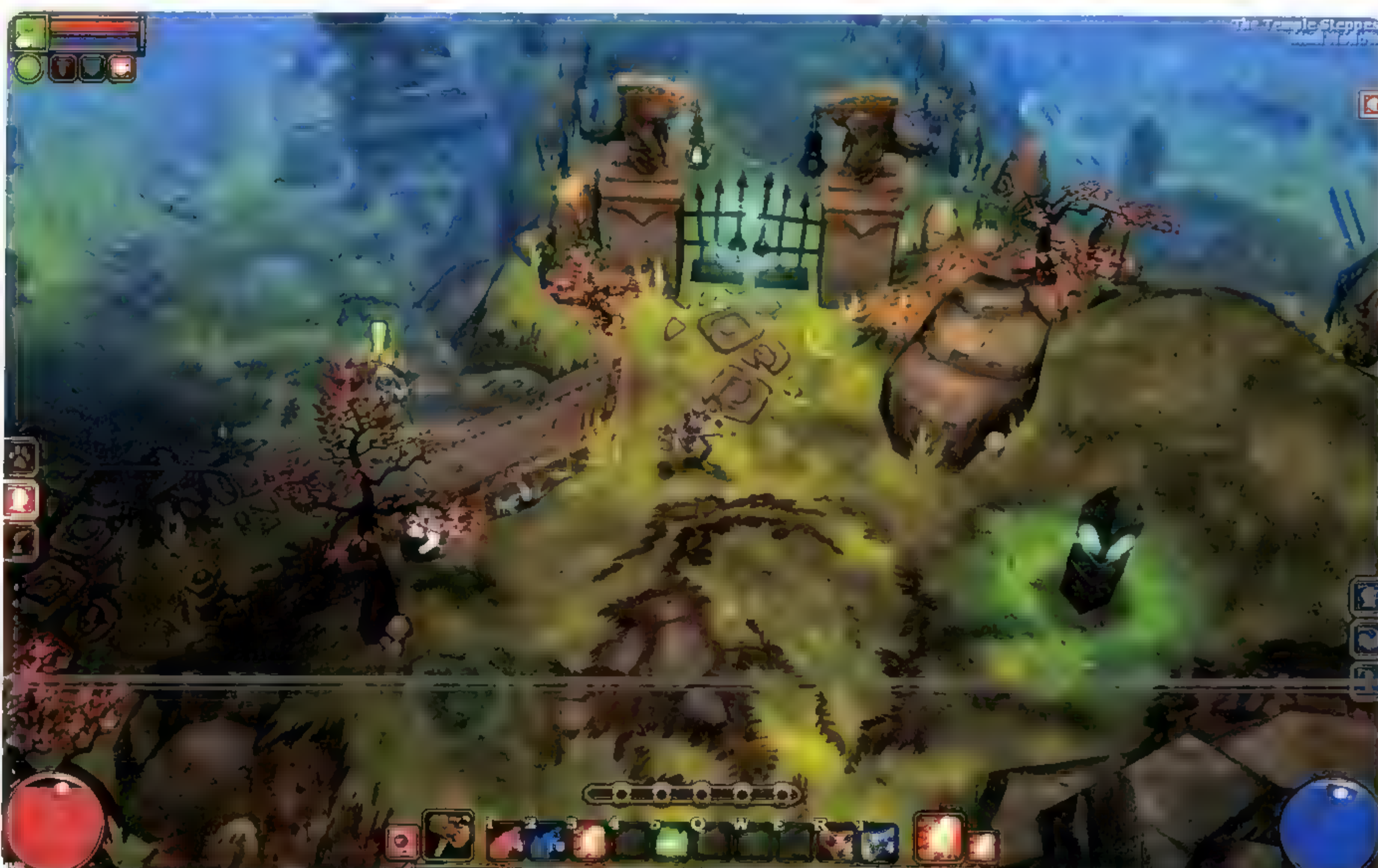
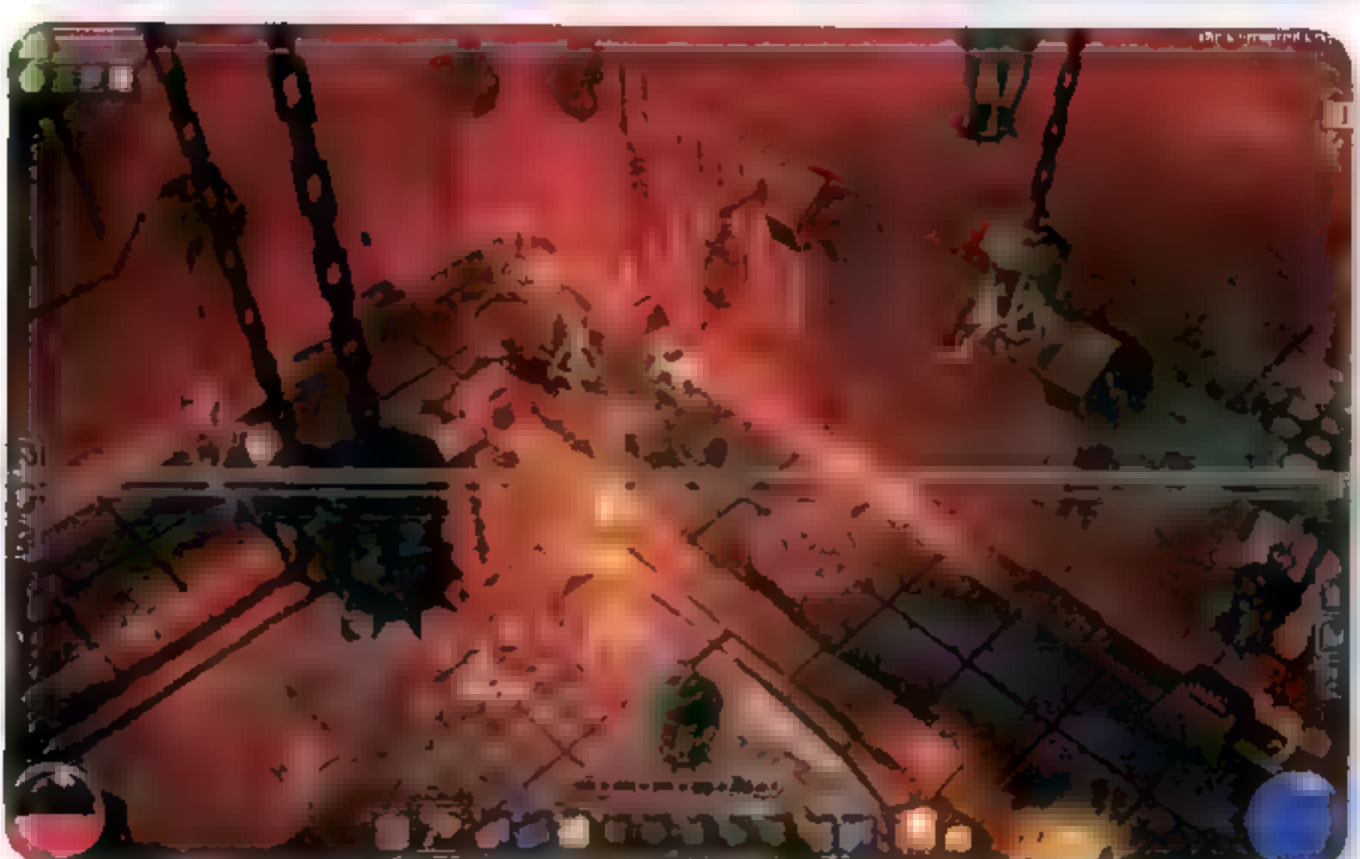
During your quests, it's very easy to get side tracked, with many secret areas and side missions to be found. It's good that the developers have decided to reward gamers who like to venture off the beaten track, and can add many hours to an already decent sized game.

You'll have your choice of four character classes, each with their own special abilities, pros and cons. However, there's nothing that we haven't come to expect from RPG games

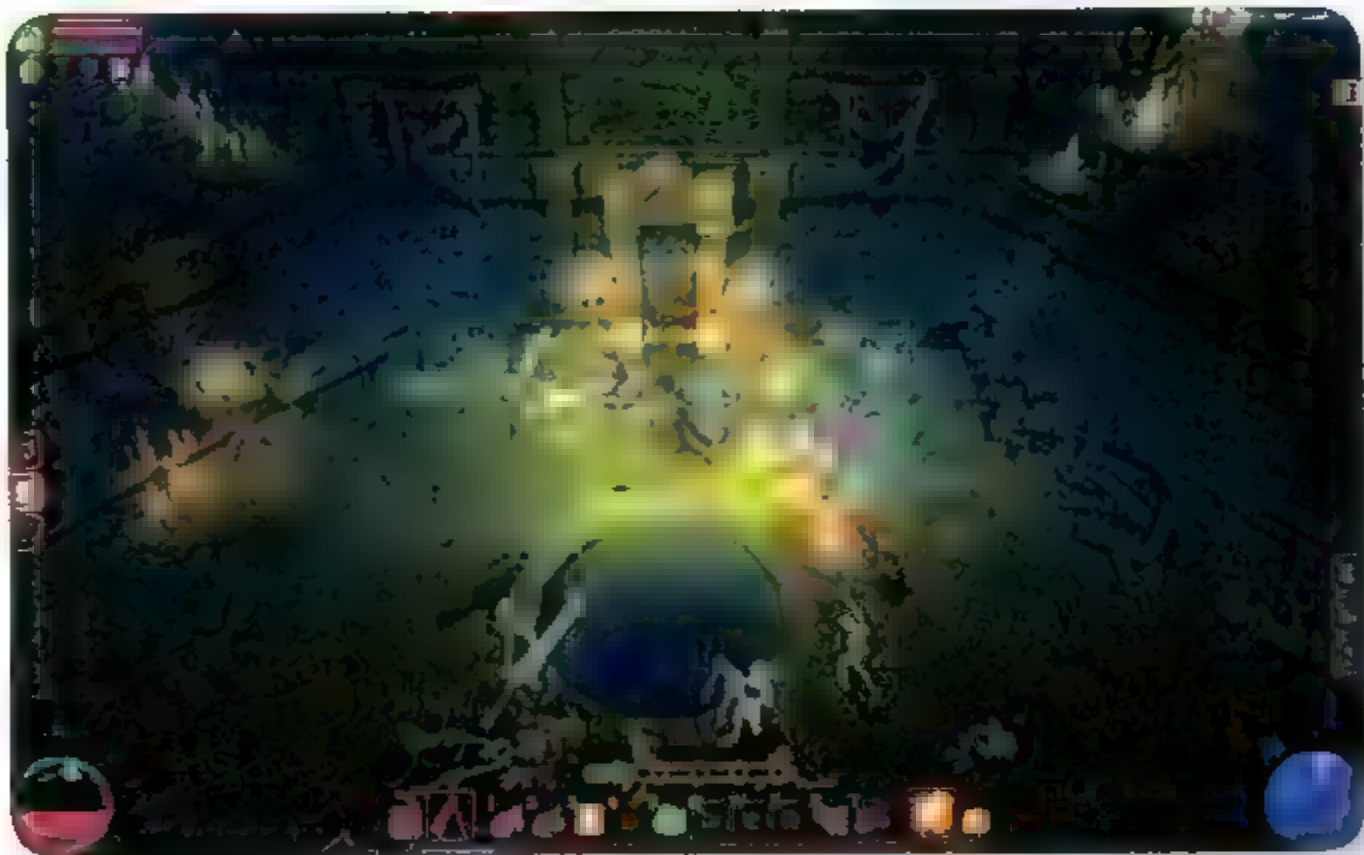
of this nature. The Engineer, who constructs bots to do his bidding, the Outlander who uses ranged weapons to dispatch enemies, the Berserker who's your typical melee brawler, and the Embermage, your typical spell caster.

Instead of trying to deliver a state of the art graphical masterpiece, Runic games has instead focussed on delivering a more memorable experience with a cross between WoW and Steampunk-stylised visuals. At first glance you could confuse these graphics for being a game aimed at kids, however it's not until you start exploding creatures all over the map that you realise how wrong you are.

Perhaps the best thing about the game is







constantly get the feeling that your character is growing and becoming more powerful. Don't be fooled thinking that you will be one shotting every enemy on the screen though, like you're the angel of death or something. There are many parts that can prove to be rather difficult and ask more from you instead of simply standing in front of the bad guy and left clicking your mouse until he stops moving.

Even though the game allows you to re-adjust your last three skill points, think carefully about where you set your skill and stat points. T2 is high identical to Diablo 2, meaning where you put these points is more of a permanent nature. Although this may eventually lead to community websites listing up the best builds for your chosen class, the more casual players should come up with many different ways to build and play the game and for the most part it doesn't punish you for your chosen build, whether it be glass cannon or tank, so you can expect to replay the game simply to try other builds for the same class.

the sheer amount of loot you receive. With no auction houses using real money to worry about, T2 will bombard you with many drops throughout the game. If you're concerned that you won't be able to carry all these items, worry not! You have a huge backpack and also a pet that not only acts as a powerful ally, but can also carry items and even be sent back to town to sell any unneeded ones. While there, it can also do your shopping, allowing you to continue your quest uninterrupted.

As you progress through the game you'll

A feature lacking from many big name PC games lately has been a LAN option. Yes we're looking directly at you Blizzard. Thankfully, T2 is completely LAN and mod friendly! And with a strong community behind it there is every chance that we'll see some amazing stuff from the mod scene. Naturally this is an IF and WHEN scenario, but for titles this popular with a strong community, it's all but a forgone conclusion. Something else to mention is that your character will be available both online and offline without the need to play each one separately.

From start to finish Torchlight 2 is an amazing game that is both fun and exciting. It offers replay value and the combat and enemy slaying never feels tired and old. The four acts will take you about twelve hours to complete with the added ability to then go back and play through on a harder difficulty. At only \$20 this is a hard game to pass up and is an easy recommendation to gamers who enjoyed any Diablo game ever and perhaps those who were a bit miffed with the third in the series. **AR**



PC

Developer Runic Games  
Publisher Runic Games  
Website [www.torchlight2game.com](http://www.torchlight2game.com)

**Gameplay**  
Rich and a whole a lot of fun.

97

**Graphics**  
Not the best, but very bright and cheerful.

88

**Sound**  
Gets the job done.

81



**Overall**  
Vastly more fun than that OTHER clicky RPG.

95%





# Dishonored

Arkane Studios has created a playground full of death, rats, and plague – and it's hella fun!

**T**here's not a lot of games that I play that leave me already planning second play-throughs, but Dishonored is doing just that. Each time the mission-complete screen pops up, I'm torn between the incredible need to see what the game has in store next, and the competing desire to replay the just completed mission to find the rest of the loot, hidden items, and new ways to defeat each challenge.

Hell, I'm already thinking about a completely new playthrough, so I can try out powers that I've not even touched yet. In a lot of ways, it's about the highest praise I can think of for a game.

Each mission in Dishonored is like a puzzle, and in turn part of a larger puzzle itself. The game has been finely honed to such a degree that the level design, skill interactions, and everything else that interacts with you as a player, seems truly seamless. Then there's the story, too – it's not the strongest, or most original of plots, but it creates a great framework for killing (or not killing, as the case may be) a lot of dudes in fun and interesting ways. But each mission and level fits into that

story wonderfully, and the game takes you from one fully realised location to another with almost breathless speed, building up a complete picture of the city of Dunwall that is really quite vast.

Basically... Dishonored delivers on pretty much every front.

## A stabby jigsaw

The way playstyle, skills, and equipment all interact in Dishonored creates a game with amazing depth. Even in the simplest of missions – go kill guy X – become masterful puzzle-games, and also very different kinds of challenges, depending on what kind of skills

or equipment you favour. As you embark on your quest to avenge the death of a kindly Empress, and uncover the conspiracies within conspiracies that has seen you blamed for the death, you also go on a spiritual journey of sorts, and this is where the game's many supernatural powers come in.

Via hidden magical runes – the left over detritus of a now extinct culture – you come in contact with the not as mythical as many think Outsider, a kind of neutral spirit that thinks you're a lot of fun to be around. With each rune you find, you can unlock more and more powerful abilities. Each has two levels, and it's unlikely you'll be able to get even close to







unlocking all of them in a single playthrough.

There's a good range of them, too, from simple health-buffs (essential for those who like to get in close and fight), nasty ones that can turn enemies to ash when you kill them (thus removing the need to hide bodies), or the very flashy ones like the Blink short-range teleport, or Devouring Swarm which – while very nasty – is simply too much fun not to use.

These skills get layered with equipment, each of which has a range of upgrades, which you can either buy outright, or find blueprints for while exploring. Again, all of those go toward complimenting how you, as a highly skilled assassin, wish to play the game. If you're fond of lots of shooting, you'll likely invest in your crossbow and pistol, while someone who wants to stay in the shadows can work on especially sneaky boots.

All this player customisation then comes alive, thanks to some amazing level design. Dishonored's not an open world game; rather, each mission takes place within a distinct area. You might traverse some of these multiple times, though, so it feels like a real, contiguous place, especially as the city starts to change based on how bloodthirsty you are in your missions.

But it's the way each of these levels is a

marvellous blend of verticality and rich interiors that really impresses. They're just so much fun to explore, with all kinds of cool ways into and out of each situation. You'll also uncover new ways to use each power as you progress through the game. Blink, for instance, while basically a movement skill, also becomes a very handy offensive power, when combined with fast turns and accurate pistol shots or swordstrokes – there's nothing quite like Blinking right in front of someone, surprising them, and then slitting their throat.

Though, too much of that, and the game will definitely have a much darker ending.

## Small beer

Dishonored is a marvellously fun experience, but there are a couple of caveats. For one, the game's textures are decidedly low-res, though the painterly artistic style of the game does make up for that, and on the upside there are some lighting effects that are quite jaw-dropping. Nonetheless, any suitably modern PC will have no issue running the game.

Also, the somewhat compartmentalised way the city of Dunwall is put together can make for some odd and disjointed gameplay. More than once we fled a scene of combat and quite a bit



of carnage, only to find unalerted guards talking about how quiet things are, just on the other side of a single door.

It's also one of the rare games that has crashed me straight back to desktop more than once. Though, in each case, I've been chain-blinking through a mess of guards, stabbing, rat-summoning and generally creating raw, bloody chaos. I kind of don't blame my system – I was having trouble keeping up, too!

Thankfully, while there are some aspects of the game's UI that seem more than a little console-hobbled, the ability to save your game at any point means you shouldn't lose much play-time at all.

Overall, though, these few niggles are minor indeed. Far more impressive is just how smoothly all the aspects of the game work to create a coherent and compelling whole, one that can be played and enjoyed in numerous ways.

After our list print-preview, we boldly called Dishonored a serious contender for Game of the Year. After actually playing the final release, I'm very happy to stand by that claim – Arkane's created something very special indeed.

DH

PC, Xbox360, PS3 (Reviewed on PC)

Developer Arkane Studios  
Publisher Bethesda  
Website [www.dishonored.com/](http://www.dishonored.com/)

### Gameplay

Rich and multilayered, with a tonne of player choice.

98

### Graphics

Textures could be better, but great nonetheless.

89

### Sound

Atmospheric and often chilling.

92

### Overall

So many ways to kill... and all of them good!

95%







Can 343 deliver the Bungie-style goodness we expect? Well, it's a pleasant surprise...

**S**o, there's a little franchise called Halo – you may not have heard of it, but it's rather popular. Something about super soldiers, power armour, and aliens, and...

Oh, I can't keep this up. Of course you've heard of Halo – even if you're a dedicated PC gamer like me, Halo is likely the one franchise that keeps your Xbox from gathering dust. That's certainly my story – apart from the odd Rockstar game, my Xbox remains cold all year, but it's just been fired up for a weekend of intense alien fighting action for Halo 4.

And, I'm quite surprised to say, it was not a disappointment.

## Lonely fan

I should admit, though, that for me, Halo is pretty much a pure singleplayer experience. I know, for a lot of folks, the game's real longevity comes from multiplayer matches, but that's always been a distant second for me. In fact, given that my review period has taken place before launch, with limited multiplayer windows, I've in fact barely looked at that side of the game at all. I may brave the wretched hive of scum and villainy that is XBOX Live once the game releases, just out of curiosity – the new Spartan Ops modes do look pretty interesting, and I am a sucker for what looks to be a deep and interesting set of armour customisations – but mostly, I'm there for the story.

The game has that in spades, though it does seem at times to be like someone stumbling forward while running – there's occasional sense that the game doesn't quite know where

it's going, so something explodes, the stakes change, and it's on to the next fight.

As a whole, though, the overarching narrative of Halo 4 is pretty tight. It's four years since the Master Chief went into cryo, and the game begins with him being woken up by Cortana.

Well, actually, the game begins with one of those odd bits that don't quite belong – Doctor Halsey, the architect of the Spartan program, apparently in custody and justifying her actions. But this goes seemingly nowhere; a shame, because it's a particularly affecting scene, and a hint that 343 really gets the heart behind the Halo story. It also looks amazing – the quality of cutscenes throughout the game is quite amazing.

In fact, the game's graphics in general are really quite stellar – this one of the best Xbox games I've ever seen.

So Cortana wakes the Chief up, because – and this is a bit hand-wavey – the battered ship they are on is about to be pulled through a rift onto a Forerunner world, along with a whole fleet of Covenant ships.

While the Chief and his AI muse are extracting themselves, they at first call for rescue, and then – once they realise the deadly nature of the world, and that there's one rather insane Forerunner who thinks humanity is an upstart to be smashed, try to call that rescue off. This fails, and the UNSC Infinity – a vessel that serves as







the hub for the game's multiplayer portion, by the way – crashes through the rift and onto the world. The rescuers end up needing rescuing, humanity needs saving, and it's action all the way as Master Chief takes on old Covenant and new Forerunner badguys.

Through all this, there's the more personal story of the last first generation Spartan and his virtual friend, now approaching the AI version of senility. Poor Cortana reveals that she's approaching rampancy, the point when an AI becomes too smart for their own good. Given the straights this pair have been through before, it's oddly affecting seeing Master Chief fight for the one friend and constant he has in a very dangerous universe.

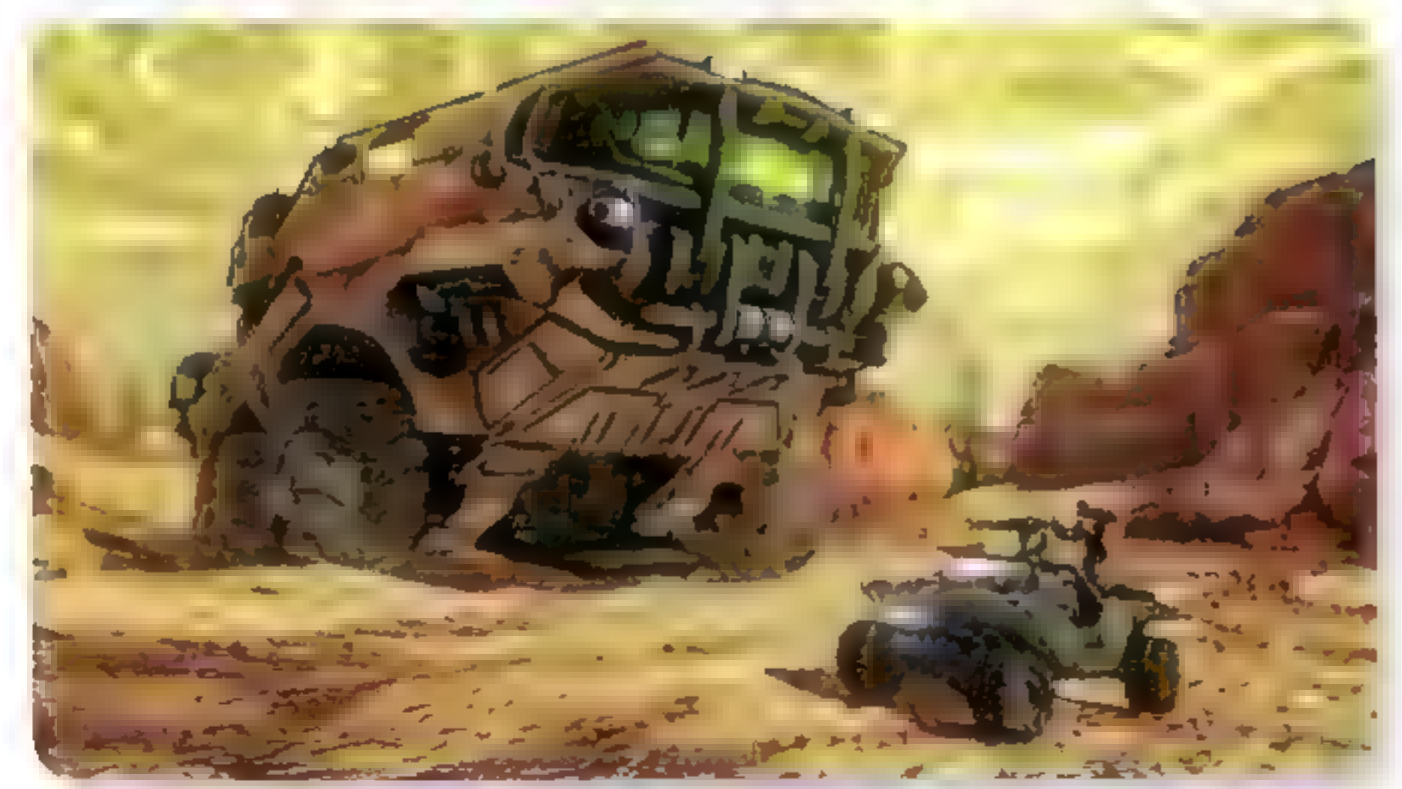
And, being the last of his generation, there's more than a hint that the Chief is past his prime. As scattershot as some of the storytelling can be, there is heart and emotion aplenty.

There's also a lot of shooting, blowing things up, and moments of high action. 343 Industries has kept to a pure version of the game's mechanics – there's no dual wielding, the controls are instantly familiar, and even the new weapons – especially the exotic, multipart Forerunner weapons – feel comfortable and useful.

The new Promethean villains, too, bring a lot of freshness to the combat experience. They're not yet as iconic as the Covenant, or even the Flood, but their abilities present interesting new challenges, like the pairing between flying drones and heavy combat units. Knights, as they are known, are a real threat at range and close up, and even when you do kill them, if you've not taken down the drones they'll repair and resurrect the fallen Knights. There are enemies that phase in and out of combat, fast ones that can climb walls and ceilings, and a range in between.

There are also some vehicles to get to grips with, including a combat walker that features in two levels (including one that is very Robotech). The coolest new vehicle is on rails, though – called the Mammoth. It seems the UNSC has gotten sick of taking on Scarabs and built their own version. It only features in a single level, but it's one of the most memorable, as you hop on and off taking out enemy outposts, defend it from air and land attacks, and then restock inside.

Sadly, vehicles feature in the game's worst levels, too. Of particular note is one sequence in a fighter craft, doing one of the silliest trench runs on the most ludicrously designed piece of



random and ever changing ship design that's ever graced gaming. It's bit of a Halo staple, and even Bungie has been known to mess these sequences up, but coming as it does at the game's end it's more frustrating than entertaining, and because of the camera angle behind the fighter, prone to constant collisions.

I clocked the game at about eight or nine hours long, which is just about acceptable, and certainly feel as though I got what I wanted out of it. What multiplayer brings to the table will be pure cream on top of an ultimately satisfying campaign – except for the fact that the classic Halo theme is pretty much missing in action. I cannot overstate how strange it is to play a Halo game without that iconic refrain.

Thankfully, after all the action, the game definitely ends on a strong emotional note. In fact, in a lot of ways, the impact of the final scenes acts as a coda to everything that has come before for the Master Chief. I'll not give it away, but he really has been fighting for a long time.

But he's not slowing down at all, and I think he's in safe hands at 343 Industries. I'm hopeful that it'll grow ever more confident as its new trilogy progresses. (DH)

#### Xbox360

Developer 343 Industries  
Publisher Microsoft  
Website [www.halowaypoint.com](http://www.halowaypoint.com)

#### Gameplay

Great action and mostly compelling level design.

89

#### Graphics

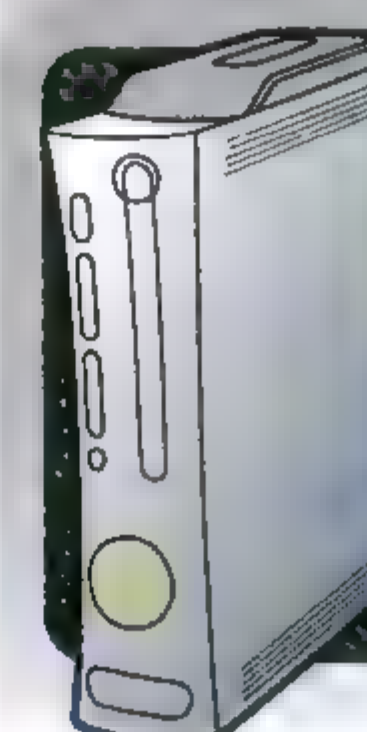
Impressive for what is now aging architecture.

90

#### Sound

Gosh I miss the Halo theme.

88



Overall  
A game greater than the sum of its parts.

93%







# Assassin's Creed III

Is this the most presumptuous game ever made?

**A**ssassin's Creed has always been a series I have wanted to like more than I have actually liked it. It's one of the biggest and most identifiable franchises in gaming, and it's about super assassins kicking Templar arse through a whole range of fascinating time periods.

Seriously, how could anyone make this boring? And yet, Assassin's Creed III, though capable of feeling like a truly great and cinematic game at times, is lumped with so much bloat and busywork that it makes being a free-running assassin in the American Revolution mostly feel like a chore.

## Can I please play the game I bought?

One of the greatest crimes of the game is how slow it starts. All the marketing and trailers shows off the game's apparent main character, Connor, but you need to invest hours of gameplay before you get to him. There is some interest in the early plots and protagonists of the game, but, frankly, that's not what I came here for. There's an argument that the game's mechanics might need introduction, but this is the third game in the series – if we don't know the basics by now, we never will.

The big annoyance about that, though, is just how little the game values your time as a player.



It's even more frustrating as a reviewer, to be honest, but unless you've got an entire days free to play the game, the slow progression to the heart of Assassin's Creed III is like a more boring version of the journey up-river in Apocalypse Now – something's always looming ahead, but you never feel like you're going to get there.

And even when you do get there, the uneven pacing of missions and side-missions, not to mention mini-games set around your frontier homestead (Yup, pig-herding sure is fun!), can just lead to more frustration, as Ubisoft places more and more obstacles between you and stabbing people in the face.

As I said, there are great bits, but in all honesty the best of them happen off the main mission. Instead of clearing towers, you'll have Templar forts to clear and occupy, and these are open affairs that hark back to the more open gameplay of previous incarnations. How you approach these forts is up to you, and the most truly emergent gameplay moments come from these missions. The game's more fluid combat is at its best in these sections, and it is much more intuitive and entertaining than ever before.

Everything else is so tightly controlled as to almost be a mockery of player agency. In the drive to create as many moments of controlled cinematic impact as possible, Ubisoft's lost sight of how to create moments of real gaming drama, where the action is player driven and open.

If the game has one strength, though, it's in the beautifully rendered world of revolutionary America. The streets of Boston feel almost real, more like an educational simulation than a game at times, and the transition from civilisation to teeming frontier is as beautiful as it is dramatic. As always, the attention to detail in terms of costuming and sense of place is remarkable.

Sadly, all the good stuff seems to be purchased with hours of tedium, historical misappropriation, or invasive hand-holding. And don't get me started on Desmond, easily the most boring character to ever grace a game – if there was a way to mod him out of the entire series I'd be a happy man.

As the franchise continues to lurch onward, the game now rests on a dangerous precipice, not unlike Connor often does himself. It could easily continue to become more bloated, more dismissive of player agency, but there's a chance the game could turn a corner and focus instead on what makes it great.

For now, though, Assassin's Creed III is just too much of a slog to find truly enjoyable.

DH

Xbox 360, PS3, PC (reviewed on Xbox 360)

Developer Ubisoft  
Publisher Ubisoft  
Website [assassinscreed.ubi.com](http://assassinscreed.ubi.com)

### Gameplay

A mixed bag, varying between awesome and banal..

63

### Graphics

Stunning design and animation.

92

### Sound

Some solid action, and good music.

88

Overall  
A mostly disappointing chapter.

69%



# Get Christmas wrapped up early...

The image displays four magazine subscription offers, each presented as a Christmas gift wrapped in a different colored paper (red, gold, green, and blue). The gifts are decorated with festive patterns and ornaments. Each gift is accompanied by a circular sticker indicating the number of issues, the price, and the savings percentage.

- PC & TECH AUTHORITY:** 12 ISSUES \$65 SAVE 46%. The cover features a Windows 8 interface and headlines like "CPU MEGATEST!" and "FREE DVD INSIDE".
- F1 RACING:** 12 ISSUES \$65 SAVE 43%. The cover features a Formula 1 car and headlines like "THE DARK HORSE RISES" and "Driver says Front roll-hoops Plus: Sid Watkins' legacy".
- LIMELIGHT:** 12 ISSUES \$50 SAVE 51%. The cover features a portrait of Cecilia Bartoli and headlines like "SUPERSTAR MEZZO Cecilia Bartoli" and "2013 SEASON PREVIEW".
- FourFourTwo:** 12 ISSUES \$54 SAVE 50%. The cover features a soccer player and headlines like "AUSTRALIA'S ONLY SOCCER MAGAZINE", "DEL PIERO", and "Sydney FC's Italian superstar talks Juventus, A-League, Heskey and EPL".

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Were you looking forward to Warfighter as much as us? Well, I'm really, really sorry.

**D**anger Close, to me, really is a mystery. As a game studio, I know they have very passionate people working for them, who absolutely believe they have made a great game with Medal of Honor: Warfighter. So it really does pain me to say this - it's possibly one of the most disappointing games of 2012.

It's not the worst, but for a game from a AAA publisher, and from a company made of some true veterans of the military shooter, it plays like a seriously compromised mess of a vision. If you look at the quality of the end-product as proof of Danger Close's - and EA's - dedication to the Tier 1 community, you could easily look at it as bit of slap in the face.

But it's that dedication, and drive to so-called authenticity, that creates the biggest problems in the game.

### It's dangerous to go alone

The single-player game is almost ludicrously short. You can finish it on Normal in all of five hours with ease, but I'd bet cash-money that a lot of gamers are going to get sick of the confusingly intercut story, the player-takeovers, and general lack of tension in the game long before then.

I started to worry early on, when - after a brief-cutscene - the game first puts you in control of your on-screen soldier. Of course, it's

already placed your crosshairs over the back of a jihadist's head, so all you have to do is click the mouse. That's a poor enough start right there, to give you so little choice and control, but from there the authenticity claims just become a joke.

In the set-piece that follows you've got to dodge shipping containers and cranes falling from the sky in a scripted sequence that owes more to the A-Team than Black Hawk Down, before you find two convenient stashes of SMAW rocket launchers to take care of a helicopter firing on your position.

"Aim at the cockpit!" yells your partner. Well, thanks for that advice.







Early missions are meant to hold your hand a little, but the level of scripting, plus effectively endless ammunition, take the tension right out of the game. The controls are ropery at best, and a lot of the scripted actions of your squadmates defy logic. One of the core mechanics of the game is 'breaching' locked doors. As you successfully do this, you unlock more and more techniques, but it just comes across as a lame mini-game; what's worse, though, is that you can be the fourth soldier through a door, and still be expected to shoot everyone. And when the friendly AI does shoot, it barely hits anything. The player of course needs to be the center of the action, but the incompetent AI is window-dressing at best, and downright lethal (hello, badly thrown grenades)

at worst.

There's not even a particularly interesting plot to hang this on, at least to start with. The game's action is broken up by a series of flashbacks and cutscenes depicting the breakdown of a marriage, but we simply don't know enough about these people to care. Maintaining a relationship while operating at this level of the armed forces must be tough, but if you're going to bring it into a game it should be done with more subtlety than this.

There are some scattered highlights, like a driving level put together by the Criterion (Need for Speed: Most Wanted) team, but they are few and far between.

## It's a shame with friends

I had been hoping that even if singleplayer was a joke, at least the multiplayer would be solid. It may become so, and we have enjoyed it in previews, but in practice the combination of terrible net-code (always a problem for EA's shooters) and generally buggy game performance make it basically a gamble whether or not your game crashes at the end of each match - and whether you can hit your mark with any kind of reliability. I know a lot of

players are having no issue, but our experience is less than thrilling.

On the upside, the Fireteam system, whereby you buddy up to a player for tighter teamwork, is still great. There's the usual range of weapon unlocks, the ability to pick nationalities is interesting. If only the Aussie soldier didn't sound like such a total caricature.

The game looks good, too, though not using all of Frostbite 2's destructive potential does seem a waste. With the generally smaller map-size of Warfighter, we can see why a truly destructible environment might become challenging, but still - after playing a lot of BF3 it seems positively backward that a grenade can't blast apart a bunch of low crates.

The major issue through all of this, though, is that after the disappointment that was Medal of Honor, I really wanted Danger Close to learn from it and create a better game this time around. There's potential in the multiplayer, and it's certain the game's going to get a lot of patching in the near future. For now, though, we can certainly understand the calls of many on the Warfighter forums.

Time to uninstall. (1/5) **DH**

PC, Xbox360, PS3 (Reviewed on PC)

Developer Danger Close  
Publisher EA  
Website [www.medalofhonor.com](http://www.medalofhonor.com)

**Gameplay**  
Overly and poorly scripted singleplayer, buggy multiplayer.

42

**Graphics**  
Frostbite 2 looks good, but feels largely wasted.

81

**Sound**  
Workmanlike music, but great effects.

89

**Overall**  
Another disappointing effort from Danger Close.

44%







We got to hang out with the game's multiplayer director.

**F**PS-based events are often a little... restrained. They're so focused on the on-screen action that they can be a little quiet at times. Always fun, mind, but still very different beasts. Not so our recent Medal of Honor: Warfighter night, which went off in a whole mess of ways.

First up, it was the first chance – even for us game writers – to get a look at one of the new competitive modes in the game, Home Run. That was exciting enough, but I think what hyped people further was that the game mode is surprisingly well-designed, taking place on small, tight maps,

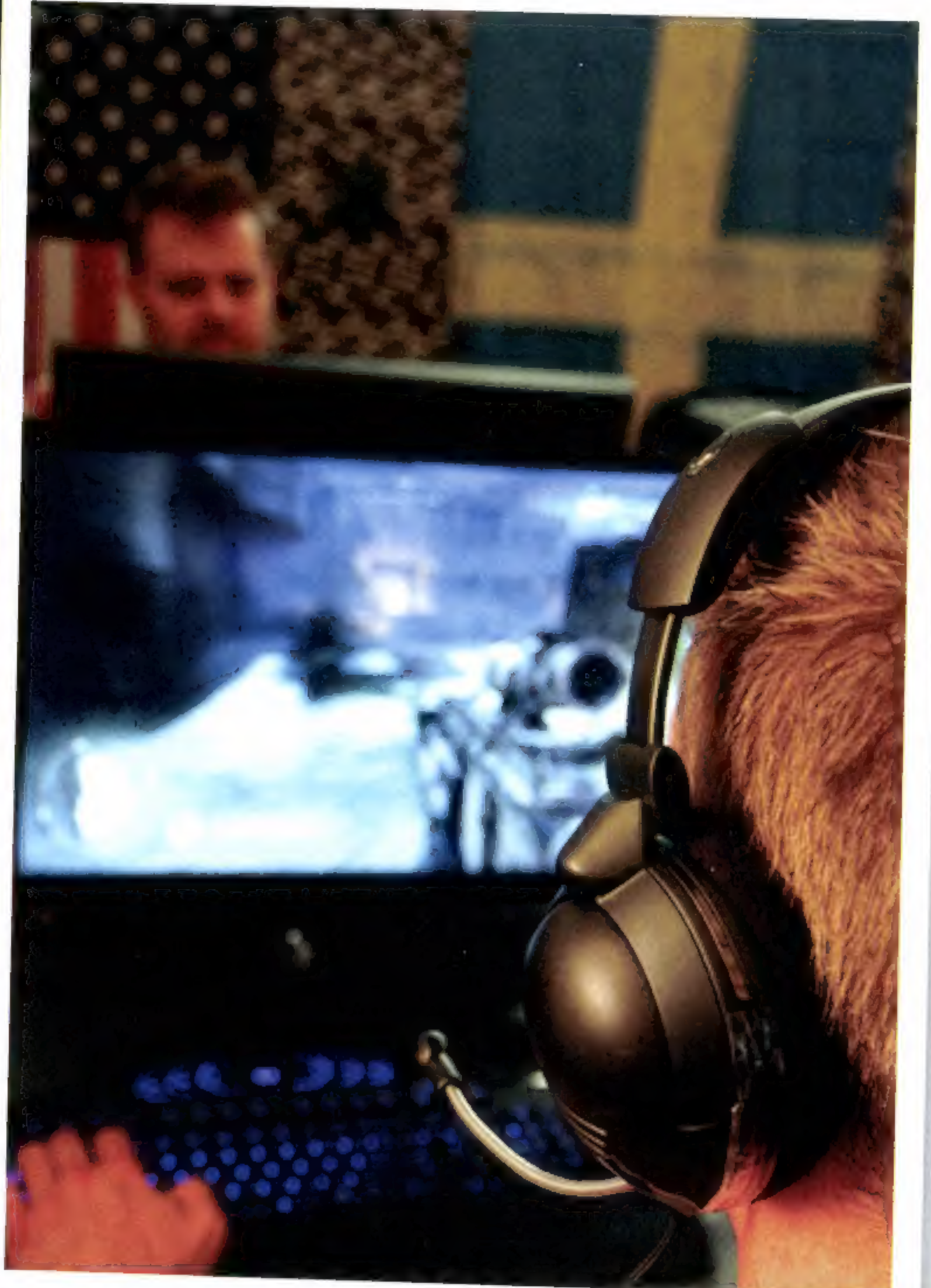
with fast gameplay and clear objectives. And it didn't hurt that it looked pretty fine on our Alienware system LAN!

We had the game's Creative Director for Multiplayer Kristoffer "Hoffe" Bergqvist as a special guest for the night. He's a great guy, and in a few days we'll post our video of his QA session with audience, but on the night he hung out, drank some beers with us, and even stood in – alongside myself, John Gillooly, and forum mod iamthemaxxx – to replace a team of players that didn't show up on the night.

It was a great opportunity to team up







with someone who had designed the game, and an absolute blast.

Of course, we let them pass through in the next rounds, and the final winning team of four walked away with exclusive Warfighter bags, packed with a t-shirt, badges, and Linkin Park CD, and everyone who attended got a snazzy shirt.

As always, aside from the game, it was a mess of fun to hang out with you guys. There was much pizza eaten, beer guzzled, and frags had, and I'm already looking forward to next time. ☺



# This is not an **O**bituary

Atomic's founding editor Ben 'Flouncy' Mansill plays the last post.

**W**ell here we are. The last goddam page in atomic.  
Ever.

Is anyone reading this?

Plenty are, and not just you. Just not enough, anymore. They're online, where I am, and everyone else is. Atomicans have always been deep online. But what's superb is that through the declining years of print, our crowd, who were always especially attuned to the net, and knew the best free and easy sources to feed their passion, chose to continue to buy this cut and glued collection of pages.

Those who supplemented their life with the atomic magazine had their own reasons to do so. You know yours. There are many, for atomic was awesome on so many fronts, and that awesome way exceeded the sum of its parts.

In the magazine world atomic was the gutsy punk that shook things up. Freaking the boat out even more because it delivered in such magnificent style. Classy and ballsy and smart and sexy. Shortly after issue 2 went onsale I got an email from the then editor of Hyper. It simply read: "Stop scaring me!".

No wonder we attracted a waterfall of people with those same qualities from day one. That's what powered it all. That crazy beautiful oneness between you, and this. We had no shortage of what some mags would call 'reader feedback'. At any random minute, day or night, we could read on our forums stuff that was in part praise, but mostly elated relief that finally there was a mag that reflected their own outlook and passion. Reflected their humour, intelligence and need to cut deeper. We reflected the emerging sub-culture that atomic helped spawn in Australia, and we were copied around the world.

The really beautiful thing was how it grew, and could only have done so by bringing in people who were on varying verges of loving the shit we loved. Atomic clicked for them – you, perhaps – and awakened something inside.

Maybe slowly, issue by issue, or maybe straight away, you came to embrace, and got fully into it. Words cannot fairly describe the buzz that gave us, but you know how it goes. You go out on a limb to do something new and a bit crazy. It's a risk. To have that repaid from the get-go with total acceptance and a demand for more worked as a key to a big door that nobody else was passing through. It was all ours. We were proud and pumped up, but more than anything we felt a wonderful obligation to please you more.

The cool thing is that it was just so easy. Easy, because when you have a budget and a vehicle to share your own passion with a crowd supercharged with excitement for what you're doing... well. It's living the dream.

I like – really like – how every single one of our new employees we brought in over the years came from the atomic community. Guest writers, too, were from the same beautiful collective.

The famous 'atomic community' was never an adjunct to atomic the magazine, or even the forums. That it was so much more was totally out of our control. It just magically happened. And when you get a mega-intense atomic crush of maximum personality and passion going on fast... well only the Cambrian Explosion or perhaps the post big bang inflation comes to mind as a comparison.

Well, that's what it felt like :) Truth be told, and I'll go out on a limb and take it upon myself to speak for others who worked on atomic, is that I don't think we'll ever again experience such a thing. For me personally, what I helped to contribute to atomic will remain forever my proudest and most satisfying achievement.

I'm indescribably happy that we don't have to say a goodbye to the forums. While atomic leaves many legacies, included amongst them the many careers it helped launch – all our writers and designers became legends in the biz and went on to bigger (not better!) things, the greatest legacy is the magnificent, beautiful, powerful community.

'Community' is now a marketers term. But for us, and you, it's real. It meant friends. Birds of a feather flocked together. And it goes on. It lives, and it continues to grow.

Sure, there's fewer people still enjoying that dinosaur of social internetting, the forums, but, to me at least, there's nothing more soothing and nice than looking at the black and green forum pages and enjoying the show and cast of characters, and being part of it.

We've seen births, deaths and marriages. Amazing success and deep personal pain. We always see support and real friendship. It's real. We party together, we have lifelong friends. And that, is what fuck it's all fucking about.

As atomic magazine exits it will always be remembered. There will never be another magazine like it. Not ever again. We are the last triumphant shout in a diminishing corner of a world changing fast. We are the last of the V8 Interceptors.

We are glorious. We are beautiful.

We are you.

**And remember – the February issue of PC & Tech Authority, on sale in January will see Atomic reborn.**

**We'll see you there.**



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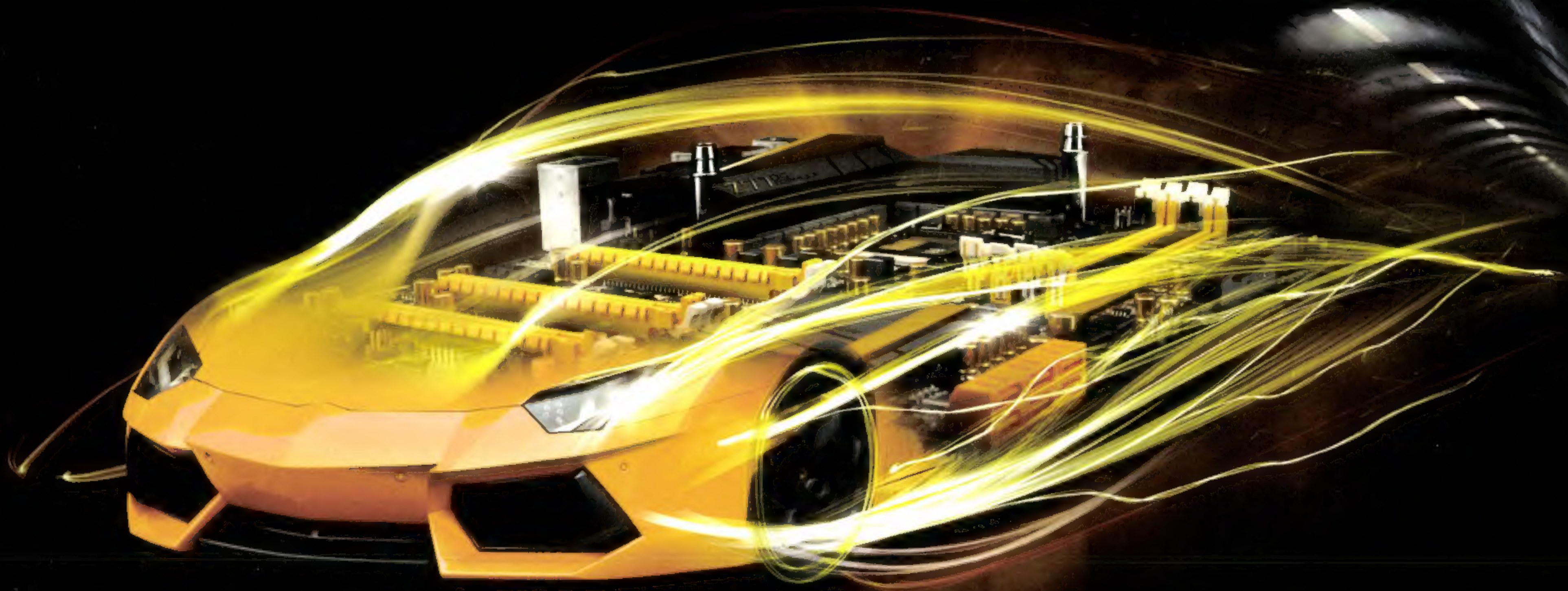
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